AVIATION WEEK
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The Birdmen's Perch

By *Major Al Williams,* ALIAS, "TATTERED WING TIPS,"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.

We liked this story.

A fella we know sat down at an unfamiliar airport, ready for the worst

Almost before he got off the runway, an attendant was at work wiping off the windshield and the drops of oil from the cowling. Next, the grease monkey asked if there was anything he could do for our visiting friend — and he asked it *cheerfully!*

When our friend asked about hotel accommodations, it turned out that the airport operator had a standing arrangement with the town's best hotel, where a good room was available. Transportation to town was also provided, and reasonably.

Next day, our pilot friend found his plane "on the line," serviced and ready to go *at the appointed time.*

He went his way, loudly praising the splendid (and shrewd!) service policies of the airport operator — and has been doing so ever since, a fact which hasn't hurt that airport's business any!

We told you we liked this story.

You see, the airport operator is one of our Gulf Dealers!

INSIDE INFORMATION

Did we ever mention how many of the Gulf gang hold pilot's licenses?

There are 19 of them in our Aviation Sales Department alone, running from student permits to multi-engine ratings!

Now when we tell you the Alchlor Process is an *extra* refining step which takes *extra* impurities out of Gulfpride Oil, we're depending upon our research men and lubrication engineers for information.

But when we tell you that Gulfpride Oil gives extra lubrication — helps get the most and smoothest horsepower out of your engine — we're depending on the

experience of ourselves and the rest of the Gulf fliers who log thousands of hours every year.

The heck with our experience, though.

Get your own experience with Gulfpride Oil and you'll see what we mean.

LITTLE KNOWN FACTS DEPT.

We're still waiting for enough mail to show clearly whether you wish to continue the LITTLE KNOWN FACTS DEPT. or want to switch to something like FAVORITE FLYING GRIPES or what have you.

Meanwhile, we're going to make a few more Perch Pilots, as follows:

Jack H. Carroll, Nogal, N. M., gets the first commission as Perch Pilot (bottom rung) because:

"Between the first flight in 1903 and the fastest flight in 1946 air speed has increased only 14 miles per hour per year!"

And here's one from Ed Kabel, College Point, N. Y.:

"Though it weighs nearly twice as much as a B-29, a B-36A can operate from any B-29 runway!"

Bless us, if we haven't got another gal in our select society of erudite hangar fliers! Kay Menges, Hackensack, N. J., adds the Perch Pilot rating to her ticket:

"The first airborne letter in the U. S. was written by Pres. Washington in 1793, carried aloft in a balloon from the Philadelphia Prison Yard."

Well, don't just sit there!

Send us a Little Known Fact or a suggestion on what you'd like this department to become.

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NEWS SIDELIGHTS

Flight Pay on Griddle

Members of a House Military Appropriations Subcommittee intend to grill top Air Force officials on why flight pay is paid to Maj. Gen. Laurence Kuter, now serving as U. S. delegate to ICAO, and other general officers. The appropriations group can force USAF to eliminate non-operational officers from receiving flight pay by slashing allocations for the purpose—which it intends to do.

Flight pay, the subcommittee's chairman, Rep. Albert Engel, points out, was intended to compensate for exceptional risk, but is now being drawn "by a pack of generals who simply stay up in the air for a required number of hours." Approximately $4,500 of Kuter's $15,000 annual salary is flight pay. Elimination of this would almost scale his USAF earnings to the $10,000 a year received by CAB members.

Airlines Eye Reeves

If Adm. John W. Reeves Jr. decides to retire from the Navy after the ATC-NATS merger is set, several airlines will be bidding for his services, with Pan American the leading contender. NATS' outstanding record in safety and operational efficiency combined with the Admiral's chronic cost-consciousness would make him a valuable addition to a commercial air operation, industry people say.

Capital-Minded Hughes

Since Howard Hughes' forcible introduction to Washington politics last year he has continued an active interest in Washington aviation politics. Clenn Williamson, former Eighth Air Force officer who later became executive assistant to Secretary of Commerce Averill Harriman, is the latest addition to the Hughes Aircraft Co. payroll. Hughes has been active on behalf of several candidates for CAB vacancies and is supporting Joseph Marriott, CAA sixth region administrator, for the top CAA post soon to be vacated by T. P. Wright.

ALPA'S Big Chance

Air Line Pilots Association is embarrassed by its inability to recommend a suitable candidate for the post of CAB Safety Bureau director, which has been vacant since the resignation of Wallace Dawson last August. Former CAB Chairman Landis offered the post to an ALPA-approved airline pilot to give the union a chance to do something about its claim of having been neglected on airline safety problems. Many top airline pilots, including H. B. Cox of American, Bob Buck of TWA, and J. E. Wood of Western, who have been carrying the safety ball for ALPA in Washington hearings, have refused the post primarily because its $9,975 salary is too far below the $12,000-$14,000 level of high seniority airline pilots. With the passing of Landis, ALPA may have muffed its chance and given a hollow ring to its future safety recommendations because of the unwillingness of the pilots to step into a position of safety responsibility.

CAB Litigation Paralyzed

CAB members freely admit that their police arm remains almost paralyzed by lack of personnel. The Board's enforcement and litigation section consists of nine employes, including stenographic help. To date, only the worst violators among uncertificated carriers have received special attention from the enforcement section—and then only after long delay.

Airline War Training?

The President's Air Policy Commission recommendations for peacetime preparation of the airlines for emergency mobilization are being discussed by a civilian group with top Air Force administrators. Some kind of war training program would be resumed.

The group, including Col. Tom Hardin, Crove Webster, Sam Solomon, Jerome Lederer and others are formulating a plan by which airline pilots would receive commission qualification credits for classroom and flight instructions in procedures, logistics and operational problems. Sam Solomon headed the previous airline war training program and will play a major role in working out the details of the plan based on his wartime experience.

Uncertificated Carriers Warried

Two of the three remaining CAB members have manifested concern that they overstepped their powers under the Civil Aeronautics Act in granting exemptions to uncertificated carriers. Vice Chairman Ryan and Member Branch recently showed deep interest not only in the legal arguments against the proposed exemption of all cargo operators on the U. S.-Alaska route but also in intimations that CAB promulgated without proper authority the existing nonscheduled exemption (section 292.1 of the Economic Regulations) and the airfreight exemption (section 292.5). Uncertificated carriers and freight forwarders, who admit frankly they lost their best friend on CAB when Chairman Landis left, are worried by the turn of events.

Talk Air-Mail Boost

Aviation spokesmen applauding House Rules Committee's refusal to clear omnibus legislation boosting the air mail postal rate from five to six cents for floor action are treading on thin ice. The committee's antagonism is directed not at the air mail boost but at other provisions of the bill raising the postal rate on third and fourth class matter. These affect newspapers and some politically potent editors and publishers have pressured the committee to pigeonhole the bill. Members of House Post Office Committee, however, are thinking about drawing up a single-purpose bill raising only air mail rates. Odds are that this would clear rules committee and be approved by the House. Sentiment has not yet crystallized in the Senate.

Fair Minded Commissioner

New York City and aviation interests everywhere can be thankful that in Police Commissioner Wallender they have an aviation enthusiast with experienced aeronautical judgment. Wallender came up through the ranks of the aviation section of the force and knows the problems of the pilot in the metropolitan areas as well as his associates know the traffic, homicide and other problems of the city. Last fortnight Wallender proved this point by successfully arguing down a city ordinance that would have clamped rigid restrictions on flying in the New York area, including helicopters. He stood firm for Civil Air Regulation part 60 as the basis for New York City ordinances and believes that only reckless flying should constitute the basis for city regulations, having in mind the significant precedent that a New York City ordinance would set throughout the nation.

NEWS DIGEST

DOMESTIC

National Mediation Board last week was attempting to end the strike of National Airlines' clerical and station personnel. NAL President G T Baker said there had been no interruption in service during the first few days of the walkout.

Dr. Albert E. Lombard, Jr, formerly engineering consultant, has been named Director of Military Aircraft Sales for Consolidated Vultee Aircraft Corp. Lombard joined Convair in a consulting capacity in 1944 prior to which he was associate professor at California Institute of Technology.

Thomas K. Finletter, chairman of the President's Air Policy Commission, has accepted the post of chairman of the planning board for the International Air Exposition, scheduled for July 31 at Idlewild, New York's International Airport. President Truman has been invited to attend opening day ceremonies.

Civil Aeronautics Administration has extended until Aug 31, 1948, the issuance closing date for limited airworthiness certificates applicable to surplus aircraft. Reason for the extension (from Jan. 31) was recent advancement to June 30, 1948, of War Assets Administration's surplus sales authority.

First all-weather fighter training project has been initiated by the Fourth Fighter Group at Andrews Field, Md., Strategic Air Command headquarters. Using Lockheed P-80 fighters, the group is maintaining five daily schedules between Andrews and Clinton County Air Field, Ohio, regardless of weather. An outgrowth of the All-Weather Air Line, the new project is designed to provide training prior to activation of special all-weather fighter aircraft, now under development.

FINANCIAL

Securities and Exchange Commission has approved a three months' extension of the maturity of $1,100,000 in Northeast Airlines notes held by Atlas Corp. Under the extension, the notes will mature Mar 31.

FOREIGN

British European Airways has announced it will reduce its staff as one step in a program to cut its deficit. In its first financial year the carrier lost more than $8,000,000.

Canadian and Bahamas governments have signed an agreement which will facilitate early establishment of Trans-Canada Air Lines' proposed service between the Dominion and the Colony.

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CAA Seeks $23,099,000 Fund For Radar, Approach Lights, ILS

Fate of airways program depends on reversal of Congressional attitude; military-civil agreement reached on high intensity lights; GCA also included.

Progress toward the goal of civilian all weather flying this year will be measured largely by the fate of the Civil Aeronautics Administration's $23,099,000 request for new air navigation aids now before Congress. It was a Congressional slash of more than 30 percent in the appropriation for fiscal 1948 that virtually stymied modernization of the federal airways system.

Major items in the fiscal 1949 navigation and landing aids program currently include:

• **ILS**—Despite a Congressional rebuff on its VHF radio instrument landing system last year and a warning by Rep. Carl Hinshaw (R., Calif.) that he would oppose all further ILS expenditures, CAA's largest single item is $5,918,000 for some 46 new ILS installations and modifications of 63 systems already installed. Breakdown is $2,800,000 for 40 new installations in the United States, $691,000 for six ILS and distance measuring equipment installations in Alaska, $817,000 to change 65 ILS localizers from equisignal to phase comparison, and $1,610,000 for duplicate emergency ILS transmitters at installations already in operation. There are now 57 ILS sets in commission.

• **High Intensity Lights**—CAA requested $2,370,000 for 39 single row high intensity approach light systems to be installed at major airports. With speedy action on this request it would be possible to have installations completed at a half dozen major air traffic centers before next winter's bad weather season. Many safety experts believe that this item offers the most promise for an immediate increase in the safety and regularity of marginal weather operations. CAA's request was backed by an agreement between military and civilian aviation representatives on the specifications for high intensity approach lights. However, military will use two rows paralleling each side of the runway while civil airports will have a single row on the left side of the runway according to the agreement.

• **Radar**—Total of 22 sets of precision beam (GCA) radar costing $2,970,000 and 21 sets of surveillance radar for traffic control costing $2,121,000 were requested.

• **Distance Measuring Equipment**—CAA asks $2,003,500 for 90 units of distance measuring equipment to be used with omni-ranges. Total of 597 DME units is planned for the omni-range system with 16 units provided for in the 1948 appropriation of the Administration.

• **Alaskan Airways**—Total of $3,035,420 is sought for improvement of Alaskan airways used by international airlines. Bulk of funds are for ILS and radar installations at six airports and living quarters for personnel in communications work.

Labor Shift

What is the labor turnover in aircraft and aircraft parts?

For October, the U. S. Bureau of Labor Statistics gives this answer:

In aircraft, for every 1,000 employed, there were 74 hired and 59 separated.

In aircraft parts (including engines), the ratio was 33 hired and 34 separated for every 1,000 employed.

STRATOVISION NEARS FLIGHT TEST STAGE

Modification of a Boeing B-29 bomber as the airborne component of the Martin Stratovision system is nearing completion with flight tests scheduled shortly. Photo at left shows artist's conception of completed B-29 as it will appear during FM and Television program rebroadcasting operations. Huge 25-ft. antenna mast below nose telescopes up into fuselage. Photo at right shows installation of fin mast, used for receiving program from ground. About 5,000 lb. of special equipment, designed by Westinghouse Electric Corp. engineers, will be carried. Initial tests will be made over Baltimore transmitter.

RUSSIAN B-29 VERSION

First photographic evidence of Russian B-29 development shows the Tupolev TU-70 in flight and ground closeup. Allegedly designed by Andrei N. Tupolev, the striking resemblance to the Boeing B-29 Superfortress is clearly evident in the engine nacelles, wing panels, landing gear, nose enclosure, vertical stabilizer and general fuselage lines. Fuselage is 119 ft. long (20 ft. longer than B-29) and features "step" windshield, replacing smooth B-29 nose. Span remains 141 ft. 3 in. of Boeing B-29. Wing appears lower on fuselage. Only nose compartment, containing crew of five, is pressurized (as in B-29). Engines are patterned after Wright Duplex Cyclones and are built at Far Eastern Ural State Aircraft Factory. Craft is 70 passenger prototype for Russian airline use.

Northrop, North American Profit

First quarter reports for fiscal 1948 indicate both firms in black.

Northrop Aircraft Inc. and North American Aviation reported a profit for the first quarters of their 1948 fiscal year. Northrop had a net profit of $106,000 for its first quarter (Aug. 1-Oct. 31, 1947) and paid a 23¼ cent dividend. North American reported unaudited figures showing a $39,011 net profit before provision for $15,500 in federal income taxes for its Oct. 1 Dec. 31, 1947, quarter.

For the fiscal year Aug. 1, 1946 July 31, 1947, Northrop had reported a net of $250,000 on $29,000,000 sales volume, resulting in declaration of a 25-cent fiscal year dividend.

Northrop sales for the first quarter just reported were $6,700,000 and a backlog of $19,00,0000 was recorded Oct. 31.

The quarter brought North American a new business gain of $70,699,204 which raised the backlog of unfilled orders to $269,148,114. During the first quarter of the preceding year the company showed a net loss of $216,784.

Due largely to activation of the B-45 jet bomber production line at Long Beach, North American employment rose from 16,330 at the start of the quarter to 18,522. Further gains in the employment total may be expected as the year progresses.

While the company gave no explanation of the $70,699,204 of new orders acquired during the fiscal quarter, it may be assumed that the amount covers at least a portion of a reported order for 224 P-86 swept wing jet fighters and an additional 44 B-45 jet bombers, bringing to 140 the total number of bombers ordered.

AVIATION WEEK is informed that the P-86 shows exceptional promise as a tactical fighter, and that maximum speed exceeds 650 mph. Production version has a tactical range exceeding 1,000 mi. and a service ceiling above 40,000 ft.

Convair losses already have been cited, and 1947 reports by Douglas and Lockheed are not expected until March.

Lockheed's report will be based upon 1947 production of 55 Constellations, 49 Navy P2V-1 and P2V-2, 259 P-80 A and B, and a conversion of 193 P-80-AN to P-80B design. Profits from delivery of these aircraft will be modified appreciably by major redesign of the P2V-2 and some 8000 changes in the Constellation. The bulk of the latter is involved in conversion of the Model 40 design to the "Cold Plate" models Nos. 649 and 749.

Extent to which supersonic research and guided missile projects will have influenced manufacturers' 1947 financial reports cannot be determined, in view of existing security restrictions, but it is reasonable to anticipate that gains in this field of development and production will be experienced throughout the current year. North American, for example, discloses that during the past fiscal year its aerophysics department grew from 170 to 500 employees.

Lee Expected To Succeed T. P. Wright

Fred Lee, Deputy CAA Administrator, last week appeared to have the best chance for succession to the Administrator post which is being vacated by T. P. Wright.

Others reported under consideration, in addition to William Anderson, Pennsylvania aeronautics director whose name was listed last week, include Joseph Marriott, Sixth Region CAA administrator, Santa Monica, Calif., and Leslie L. Schroeder, Minnesota aeronautics director.

▶**Truman Tribute**—President Truman accepted Wright's resignation in a letter dated Jan. 24, paying tribute to his work:

"During the seven and a half years which you have spent in government service you have given unsparingly of your talents and time to help win the war and subsequently to develop a strong civil aviation industry. To war production activities you made a notable contribution and it was my pleasure to award you the Medal for Merit in token of your distinguished work in that field. In the direction of the development of civil aviation as Administrator of Civil Aeronautics you have continued to give outstanding service," the President's letter said.

Text of Administrator Wright's letter of resignation listed as reasons for leaving: "My urgent need to increase my income substantially above the salary Congress appropriates for the position, the apparent unlikelihood of promotion or advancement, the very fine outstanding offers I have received, one of which I intend to accept. This position will afford an opportunity for service in the field of education and research over a wide field of human endeavor. This broadening of outlook is attractive and to me important.

"I have mentioned the above in some detail as I believe my case is not unique but rather the rule with those in Government service in administrative positions who do not possess independent wealth. Possibly such an apparent prerequisite for continuing Government service is not consistent with a correct conception of our democratic ideals," the Administrator's letter continued.

▶**New Wright Post**—The President's letter accepted Wright's suggestion that effective date of his resignation be "a couple of months hence."

Administrator Wright has accepted the position offered by Cornell University, as president of the Cornell Research Foundation and vice-president of the university. His principal responsibility will be to head the Cornell Aeronautical Research Laboratory at Buffalo, N. Y.

Aviation Maintenance Corp. To Produce Allison Radar

Aviation Maintenance Corp. will be production manufacturer of the lightweight Allison airborne radar, designed by Don Allison & Associates of Los Angeles.

Reagan C. Stunkel, AMC president, said, "Our plan is to produce this unit in quantities at a sales price that will be less than that of the standard radio communication equipment now carried in airliners."

An experimental prototype installed in a Southwest Airways DC-3 last fall weighed less than 70 lb.

Awarded honors by the Institute of the Aeronautical Sciences (left to right). Tice, Schubauer, Gaylor, Clousing, Holzman, Skramstad.

Guggenheim Medal To Lester Gardner

Award one of several at IAS meeting; Finletter discusses foreign air policy.

Lester D. Gardner, who conceived and organized the Institute of Aeronautical Sciences, received the Daniel Guggenheim medal at the IAS 16th annual Honors Night Dinner last week as the organization met four days in New York.

Gardner

Principal speaker was Thomas K. Finletter, who elaborated on key aspects of the recent report by the President's Air Policy Commission, of which he was chairman.

▶**Outstanding Achievement**—The award to Major Gardner—presented on behalf of the Institute, the American Society of Mechanical Engineers, Society of Automotive Engineers, and United Engineering Trustees, Inc., by T. P. Wright, retiring head of the Civil Aeronautics Administration—was bestowed for outstanding achievements in advancing aeronautics, particularly the founding of the Institute.

Gardner was Chairman of the Council and president of the Archives of IAS when he retired last year. The medal was awarded last June but the presentation was not made until last week. Actually it was SAE's turn to present the honor, but because of Major Gardner's part in affairs of IAS, the occasion was planned to coincide with the Honors Night dinner.

Recipient of many other honors for his interest and achievements in aeronautics, Major Gardner also was founder of AVIATION magazine, oldest aeronautical publication in the United States, now a part of AVIATION WEEK.

▶**Other Awards**—In addition to the honorary fellowship to Lt. Gen. James H. Doolittle, retired, and other awards at the dinner (AVIATION WEEK, Jan. 26), ten men were given IAS fellowships.

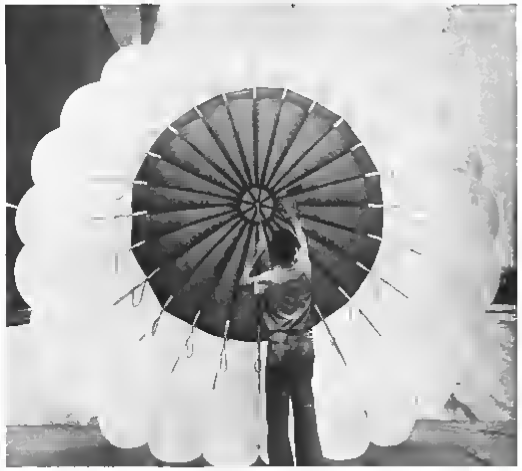
The gathering heard Mr. Finletter, speaking on "Foreign Policy for the Air Age," discuss the relationship of Commission recommendations to the broad foreign policy of the U. S.

Like previous sessions, last week's meeting was taken up largely by technical papers, some of which are summarized elsewhere in this issue (see page 18). More detailed reports will follow in subsequent issues of AVIATION WEEK.

▶**Transport Symposium**—One of the important early portions of this meeting was an air transport symposium to discuss, among other things, method for bolstering the present inadequate system of air traffic control.

Keyed with analysis of traffic problems were recommended solutions offered in coordinated papers on "Air Traffic Control," by Sir Robert Watson-Watt, scientific adviser on telecommunications, Air Ministry, Great Britain; "Operational Procedure," by Capt. A. S. Born, USN, Office of Chief of Naval Operations; "Technical Problems," by Vernon J. Weihe, Air Transport Association of America, and "Specific Method of Implementation," by Nathan Braverman, assistant chief engineer, Communication and Navigation Laboratory, Wright Field.

Need was cited for the immediate development of an integrated electronic system which would serve all aircraft. Many of the operational and technical experts in the field of air navigation and traffic control believe that an evolutionary system that utilizes ground radar interrogation of air-borne transponders, with an associated private-line communication system, can form the basis upon which an adequate control system can be evolved.



NAVY DEVELOPS NEW CHUTE

A parachute that allows a top panel canopy to open and spill air when jumps are made at speeds up to 500 mph. has been developed by the parachute experimental unit of Lakehurst, N. J., Naval Air Station. As the jumper's speed decreases, elastic cords attached to the "cap" pull it back into place. Thus far, experiments with the chute have been limited to dummy bombs. (Press Assn.)

Engines Blamed in Syrian Crash

Senate investigators' report urges more frequent overhaul for airline safety.

Failure to change an engine after it exhibited numerous symptoms of malfunctioning was blamed for the crash of a Pan American World Airways Constellation in the Syrian desert last June 19, by Caro Dolan, special technical consultant to the Senate Interstate and Foreign Commerce Committee. Seven passengers and seven crew members were killed.

Dolan's report claimed that the Constellation's No. 2 engine was defective from the start of the flight from New York and had it been replaced at Gander, Newfoundland, the accident might have been averted. Between New York and Gander the No. 2 engine had to be feathered due to a marked drop in brake mean effective pressure. Spark plugs were changed on a cylinder at Gander but the plane was forced to return to Gander due to similar symptoms in the No. 2 engine. This time a complete cylinder was changed and found to have suffered a top piston ring failure.

▶**Hydraulic Change**—On arrival in Rome a new hydraulic pump was installed because of a leaking oil seal on the same engine. At Istanbul this engine was reading 15 BMEP low at rated power settings. Left magneto breaker points were found closed and had to be opened.

At Karachi, the turnaround point, a service check was made and the flight took off for Cairo after the crew rested 16 hours. About 80 miles northeast of Adaban the No. 1 engine failed at 18,500 ft. due to a broken exhaust rocker arm on No. 18 cylinder. The propeller was feathered. Three hours later No. 2 engine caught fire due to a main thrust bearing failure. It fell out of the plane pulling fuel lines with it, just before the Constellation made an emergency landing near Mayadine, Syria.

▶**ICAO Criticized**—Dolan also criticized the State Department and Civil Aeronautics Administration and ICAO for contributing funds for upkeep of certain foreign weather forecasts without demanding more efficient service. He pointed out that the Ankara, Turkey, forecast furnished this flight was 24 to 30 hours old. Other Dolan recommendations included:

▪ Use of methyl bromide as an engine fire extinguisher instead of carbon dioxide.

▪ Overhaul of Constellation engines every 500 hours until major bugs are eliminated. Two of the four engines on the ill-fated plane had more than 600 hours since their last overhaul.

▪ Escape hatches should be provided to facilitate emergency exit regardless of the condition or position of the plane.

Other accident reports included CAB verdicts on two Slick Airways C-46 cargo plane crashes and a National Fire Protection Association blast at airport fire fighting equipment and the use of integral wing tanks in the fire following Jan. 21 landing of an Eastern Airlines Constellation on a snowbank lined runway at Boston.

▶**ILS Landing**—The Constellation made an ILS landing at Boston and struck a snowbank on the left side of the runway. Impact collapsed the right gear and put a severe strain on the right wing where fire developed quickly around an engine. Fuel pouring from the ruptured integral wing tanks was ignited and the aircraft almost completely destroyed. None of the 25 passengers and crew was seriously injured.

Slick C-46 crash at Denver on Feb. 14, 1947, while making a practice ILS approach at night was blamed on loss of control or overcontrol by the pilot and failure of the co-pilot to remain alert during the approach. CAB report said the ILS had a slight dip but was not hazardous. Both pilot and co-pilot were killed and the plane demolished when it hit a 218 ft. hill 3,230 ft. short of the runway.

SEC Report Indicates Aviation Security Upswing

A definite improvement in sentiment by aviation officials toward their own securities is evident in the summary of security transactions for November, 1947, released recently by the Securities and Exchange Commission.

While a number of outstanding sales were recorded, the purchases of aviation shares were far more significant.

L. S. Rockefeller acquired an additional 5000 shares of Eastern Air Lines, bringing his total holdings up to 50,000. E. M. Queeny also bought an additional 1000 shares of American Airlines common to boost his holdings to 15,000 shares in that equity. D. C. Frawley purchased 300 shares of Capital Airlines common stock, bringing his total ownership up to 1020 shares.

In contrast, Sherman M. Fairchild continues a persistent seller of Pan American Airways, liquidating 3000 shares of that company and reducing his holdings to 17,700 shares.

Also on the selling side, Sigmund Janas sold 5800 shares of Colonial Airlines, bringing his holdings down to 25,438 shares.

INDUSTRY OBSERVER

▶**First "NX" Convair-Liner arrived at American Airlines' Ardmore, Okla., base late last month, and crew training was slated to start immediately. Delivery of two more ships is expected shortly.**

▶Contracts for reconditioning 150 twin-engine Curtis Comandos purchased by the Chinese government have been received by Slick Airways and Grand Central Airport Co., Glendale, Calif. The planes, bought from the War Assets Administration for $5,000 each, will be used by the Chinese Air Force. Grand Central will recondition 100 of the C-46s (all of the A and D series) and Slick will modify 50.

▶**Consolidated Vultee's XC-99 military transport and cargo plane, the world's largest land-base plane, made its third flight in San Diego, Jan. 22. Lasting three hours and 10 minutes, the flight was made at a gross weight of 245,000 pounds, an increase of 15,000 pounds over the weight carried on its second flight. The big plane carried a load of 11,590 gallons of fuel, 1176 gallons of oil, and 12,775 gallons of water as ballast. Crew of 13 tested the plane for air speed calibration and general handling characteristics at the increased gross weight.**

▶West Coast engineers have preliminary sketches ready to show airlines how existing big transports might be modified to adopt turbo-prop power units. Britain's "Python" turbo-prop unit is a favorite drafting board model. Sudden emergence of a Stratocruiser, DC-6, Constellation, or Constitution with turbo power is unlikely. Airlines are too poor to finance it. Such conversion would require more than a simple exchange of powerplants in current airframes. While some four-engine transports aerodynamically could accept the higher speeds of turbo-prop operation, they would have to be rebuilt at great cost to strengthen their structures for high-speed stresses. A transport in the 175-200,000 lbs. weight range might have to have as much as 20,000 lbs. of structural "beef-up" added to permit operation at 375 mph. which is the minimum cruising speed at which a turbo-prop installation would begin to pay off in operating economies. Sketches of turbo transports are "window dressing," impractical but sound in their purpose of reminding airline customers that as soon as they can show the color of their greenbacks the manufacturers will start building jet transports.

▶**How closely speculation can be keyed to actual developments is difficult to say, but some aerophysicists on the West Coast are wondering if the long-discussed orbital rocket, fired into outer space at such speed that it will balance against earth's gravity pull and become a satellite, may be achieved by a three-stage rocket in the course of V-2 tests at White Sands. Sketch pad doodles portray a V-2 serving as a massive booster rocket for a powerful, slender sounding rocket based in the V-2 nose cone. When the V-2 has reached maximum speed a secondary booster rocket will kick the sounding rocket on upward as the latter's engine starts firing.**

▶Closter Aircraft Co. is working on a new jet fighter powered by a Rolls Royce Nene jet engine. Second version of the Armstrong-Whitworth AW-52 jet flying wing will be powered by Rolls Royce Derwent engines instead of Nenes. Slimmer Derwents can be buried completely in the wing to reduce drag.

▶**Army Ground Forces has approved the L-17A Navion and requested additional quantities for Air Force procurement during fiscal 1949 and 1950. Air Force, which procures AGF aircraft, has already ordered an additional 50 Navions from Ryan Aeronautical Corp. for immediate delivery, bringing to 133 the total already procured. Total purchase of Aeronca L-16A liaison planes has reached 613, of which 132 remain undelivered to the AGF. National Guard has received 376 L-16A and 47 L-17A.**

▶University of Illinois has received an Office of Naval Research contract for a study of fuel mixing in turbojet, ramjet and rocket engines at supersonic velocities. A fluid mixing laboratory, containing a compressor producing 500 cu. ft. of free air per min. at a pressure of 100 PSI, is now nearing completion. The project is under the direction of Dr. L. C. Alexander.

▶**North American Aviation has started deliveries on B-54A four-jet bombers on an Air Force contract for 100 of the type. First production models are being flight delivered from their Long Beach assembly plant to Muroc Air Force Base for preliminary flights. B-45 is slated for assignment to Tactical Air Command units with headquarters at Langley Field, Va.**

AVIATION CALENDAR

Feb. 3—American Legion national aeronautical confrence, Wright Field.

Feb. 5-7—American Legion national aeronautical conference, Indianapolis.

Feb. 13—Air Transport Command reunion, Waldorf Astoria, New York.

Feb. 15-17—Seventh annual Purdue Airport and Flight Base Conference, Purdue University, West Lafayette, Ind.

Feb. 17-19—ATA meteorological committee, Peabody Hotel, Memphis.

Feb. 25-27—Louisiana Aviation Conference, Shreveport.

Mar. 5—ICAO maps and charts division, Brussels.

Mar. 8-10—California State Aviation Conference, Hollywood Roosevelt Hotel, Hollywood.

Mar. 18—National flight propulsion meeting, Institute of the Aeronautical Sciences, Cleveland.

Mar. 22—ICAO aeronautical maps and charts division, Brussels.

Mar. 28-31—Annual conference, Society of the Plastics Industry, Santa Barbara, Calif.

Mar. 30—ICAO personnel licensing division, Montreal.

Mar. 30-Apr. 1—Air Transport Association engineering and maintenance conference, Continental Hotel, Kansas City.

Apr. 1-5—American Institute of Electrical Engineers, Des Moines.

Apr. 4-8—American Association of Airport Executives, Congress Hotel, Chicago.

Apr. 20—ICAO rules of the air and air traffic control division, Montreal.

Apr. 24—Dedication of Skyway 1 and 11 and dedication of CAA aeronautical center, Oklahoma City.

Apr. 27—ICAO facilitation division, Europe.

Apr. 28-30—American Institute of Electrical Engineers, northeastern district meeting, New Haven, Conn.

June 1—ICAO second assembly, Palais Des National, Geneva, Switzerland.

June 14-16—Airlines Medical Directors Association annual meeting, Royal York Hotel, Toronto.

June 15-17—Airport management conference, College Station, Tex.

June 16-18—19th annual meeting, Aero Medical Association, Royal York Hotel, Toronto.

June 21—American Society for Testing Materials annual meeting and exhibit, Detroit.

June 24-25—American Institute of Electrical Engineers summer general meeting, Mexico City.

July—International Air Exposition, Idlewild Airport, New York.

July 15—Ninth annual meeting, Airline Advisory Board, Kansas City, Mo.

July 31—International Air Exposition, Idlewild Airport, New York.

Aug. 24-27—American Institute of Electrical Engineers, Pacific general meeting, Spokane, Wash.

Sept. 2—International Aeronautic Federation, Cleveland.

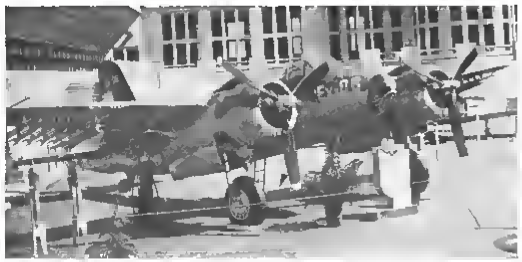
Sept. 4-6—National Air Races, Cleveland.

Sept. 8—ICAO operations division, Montreal.

Sept. 13-17—Annual conference and exhibit, Instrument Society of America, Convention Hall, Philadelphia.

Sept. 21—ICAO airworthiness division, Montreal.

Oct. 5-7—American Institute of Electrical Engineers, middle eastern district meeting, Washington.



ARGENTINE MOSQUITO

Twin-engine "Calquin" is native Argentine design powered by two Pratt & Whitney engines. A light bomber, it carries machine guns and a variety of aircraft rockets. About 250 are being manufactured by the Instituto Aeronautico at Cordoba, official Argentine government aircraft factory. (McGraw-Hill World News photo)

Congress Readies New Procurement Laws

Congressional approval of omnibus legislation, codifying and modernizing procurement law and regulations of the Army, Navy, and Air Force, appeared imminent. The House approved measure was passed by the Senate and turned over to a joint conference committee.

Conferees are expected to accept Senate changes adjusting the legislation to the present national defense set-up. The House passed the bill prior to the unification of the services. Another Senate change, requiring cost-plus fixed-fee contractors to give advance notification of any subcontract in excess of $25,000 or five percent of the contract, and authorizing the procuring agency to investigate the books of such subcontractors, is also expected to be approved without controversy. This amendment, it was pointed out by Chairman Chan Gurney (R., S. D.) of the Senate Armed Services Committee, is designed to prevent re-occurrences of "the Gen. Meyers case," in which the former deputy procurement chief at Wright Field allegedly was responsible for the funneling of aviation subcontracts into Aviation Electric Co., an Ohio firm which he owned, according to charges.

▶**Competitive Policy**—While laying down a policy of competitive bid contracts, with awards going to the lowest bidder, the legislation gives legal sanction to negotiated contracts, under specified circumstances, by the Army, Navy and Air Force. These are, as follows:

- **During a national emergency,** if public exigency will not permit delay incident to advertising for competitive bids on contracts.
- **If aggregate amount** of a contract does not exceed $1,000, or if a contract is for personal or for professional services.
- **On contracts with educational institutions** for training personnel.
- **On contracts for experimental,** developmental, or research work or supplies for such work. Department secretaries would be required to file reports with Congress at six month intervals listing and describing the terms and nature of all research and developmental contracts negotiated.
- **Contracts for materials** including aircraft, parts, instruments, and accessories, the nature of which, for national security reasons, should not be publicized.
- **Contracts for standardized technical** equipment, which, in order to assure the interchangeability of parts with equipment that has already been procured, must be purchased from the same producers.
- **Contracts for supplies** of a technical or specialized nature—such as aircraft, requiring a large initial investment and an extended period of preparation for manufacture, on which an award to a new producer would involve a duplication of preparatory effort that has already been made.
- **If and when an agency head** determines that competitive contract bids have not been independently arrived at and that a preferable arrangement could be made through negotiation. Senate Armed Services Committee proposed that this stipulation would break collusive bidding, follow-the-leader pricing, rotated low bids, identical bids requiring drawing of lots, uniform estimating systems, and refusal to classify the government as other than a retail buyer.
- **If it is determined** to be in the national defense interest that any plant be kept in production.

The legislation also authorizes free delegation of procurement authority to promote cooperative procurement by the services. It requires that all competitive bids evidencing collusive action on the part of the bidders be turned over to the Attorney General for appropriate action under anti-trust law, and that standards and procedures for competitive bid procurement be written out.

State Airlines Requests Piedmont Service Delay

State Airlines, Charlotte, N. C., has petitioned CAB to stay the effectiveness of the feeder certificate issued Dec. 12 to Piedmont Aviation, Winston-Salem, N. C., or to order a delay in Piedmont's inauguration of service pending judicial review of the Board's decision in the Southeastern States case last April.

An unsuccessful applicant for the routes awarded Piedmont, State Airlines recently filed its second request for review with the U. S. Court of Appeals for the District of Columbia after CAB denied a petition for reconsideration of the Southeastern decision (AVIATION WEEK, Dec. 22). State contends Piedmont was illegally awarded routes it had not applied for but which State had requested. Piedmont intends to start service this month.

RECEIVES MEDAL

Grover C. Loening, aeronautical engineer, received the President's Medal of Merit from Gen. Carl Spaatz, U. S. Air Force chief of staff, with a citation for Loening's World War II "outstanding service" as aircraft adviser to the WPB chairman, and as helicopter chairman for NACA. Loening is chairman of the board of Roosevelt Field, and known both for his long experience as engineering designer and as manufacturer of the Loening amphibian. (Air Force Photo)

Air Force Industrial Mobilization Now Moves Into Second Phase

Military program under way pointed at production problems airframe and engine contractors may face in event of all-out war production.

"Operation Skypower," the Air Forces' industrial mobilization program launched last year, has moved into phase two. This means that the military has achieved a start toward solution of the bottleneck problems which would confront the airframe and engine prime contractors in the event of all-out war production.

The Air Force in June will begin compilation of an industrywide study, on the prime contractor level, of the production and material resources needed to initiate and maintain a smooth flow of finished airplanes from the industry's plants.

▶**Studies Now Under Way**—Studies of plant and material resources needed by individual airframe manufacturers to achieve (starting M-day) the production goal given them by the military high command are now under way by most of the major plane builders who are due in Washington June 1. Contracts for these studies were let by the military last year.

Meanwhile, the Air Force is putting the final touches to plans for a phase two resources study for and by the Automobile Manufacturers Association. Talks with the auto manufacturers were initiated last year and have progressed almost to the contract stage. The object is to find out what the AMA can do to augment the production of aircraft engines.

Final talks between the Air Force and AMA hinge on reports by the aircraft engine manufacturers, due in shortly, on what their capacity is and could be. When this initial answer comes in, the auto people will be asked what they could do to raise the output of airplane engines to the strategic target set by the high command. They will be asked to report on the resources needed to allow sufficient plant conversion to bring up total engine production to the target figure.

▶**Covers All Facilities**—The resource studies by the airframe industry concern all facilities needed to turn out finished airplanes. They cover plant and equipment (including tools), basic and semi-fabricated materials, manpower (both skilled and technical), and other tangent facilities such as power and transportation.

As a basis for the reports, each plant has been given hypothetical target production figures. Each report will show what present capacity is and what it could readily be expanded to under the production goal—if the firm were supplied with the necessary resources such as tools, raw materials, and manpower.

These reports, when summed up by the Air Forces' industrial mobilization sections, will show how close to a hypothetical goal the industry's present and potential production facilities could reach. The over-all survey will also indicate what the production bottlenecks comprise.

Two other facets of the mobilization program, machine tool stockpiling and education of Air Force personnel in problems and techniques of industry, are being worked out.

At present the Air Force has a goal of 47,000 machine tools for a standby stockpile. This constitutes roughly half of the requirements of the joint Army-Navy machine tool program (92,000 tools). JANMAT has achieved about 30 percent of its goal. The tools are being procured from surplus war plants and properties held by War Assets Administration.

▶**Training in High Gear**—The training in industry program, initiated by the entire military establishment recently, is going into full stride. Military personnel are enrolled in 80 colleges and universities, 60 industrial schools, and, in personnel work alone, in 41 industries. Under the program, selected young officers and key enlisted personnel are sent to technical schools for one or two years, then into various industries for another term of study. After the tour of duty in schools and plants, the students serve for a time with the procurement sections of their particular branch of service. At the end of the program the graduates return to the regular military tour of duty. They constitute a backlog of personnel who would expand the procurement sections of the various arms and services on M-day, and they will have a basic understanding of industry's problems.

The Air Force, unlike some of the other services, has done little to bring its procurement problems before industry as a whole. Officials concerned with industrial mobilization give two reasons for this. First, they do not want to get below their prime contractor procurement level (airplanes and engines) until there has been an inventory of the over-all industrial potential by the Munitions Board and a "divvy" of the production pie made by the National Security Resources Board. Second, they do not have enough money to contract for resources reports by sub-contractors and other suppliers outside the airframe industry.

There is a current strategic mobilization plan. It is a target operation through which the military planners hope to know enough about the production bottlenecks—at the outset of the next unpleasantness—to achieve planned output in just half the time it took us in World War II. The plan, which is a continuous proposition rather than a one-shot affair, points to peak production of aircraft in one and one-half years after M-day.

Plastics Manufacturers See Easing of Shortage

Forecast by the Plastic Materials Manufacturers Association indicates that 1948 will be the first postwar year in which supplies of all major plastics materials will nearly meet the demand for them.

Plant facilities projected and announced during 1945 and 1946 have now for the most part been brought into production (or will have been by mid 1948). Cost of these plants has exceeded estimates by 30 to 40 percent, and delays in completion have ranged from six months to a year beyond original dates.

Most critical supply problem facing the thermosetting material manufacturers is that of formaldehyde although current supplies of phenol and urea are not much better. Government reports indicate that production of the needed raw materials has reached very high levels and producers state the supply-demand ratio is rapidly approaching balance.

Generally the thermoplastics are expected to be available in sufficient quantities to meet requirements. Certain types may be in short supply early in the year, but this should be overcome during the second quarter.

Aeronautical Progress Disclosed At 16th IAS Technical Sessions

Papers cover new investigations in rotary wings, instruments, flight propulsion, air transport, meteorology, aircraft design, and aerodynamics.

Engineering problems confronting aviation experts in the various categories were highlighted in a series of analyses presented at the technical sessions of the Sixteenth Annual Meeting of The Institute of the Aeronautical Sciences held in New York beginning Jan. 26, and running over to Jan. 29, 1948.

Presented at the meeting's initial session concerned with studies in the rotary wing field was **"The Prediction of Response Natural Frequencies of Rotor Blades,"** by **Gabriel Horvay of General Electric's Engineering General Div.** Dealing with cases represented as not studied previously, this paper posed the problem of determining natural frequencies of hinged copter blades to insure safe operation, detailed improved calculating techniques for vibrations in the plane of rotation to afford prediction of blade natural frequency.

Stressing the advantages of a simple device to bring nearer increased use of personal copter craft, **"The Helicopter Cyclol Rotor"** by **Joseph Stout III, project engineer, United Helicopters, Inc.,** covered design requirements of a new system to produce a smooth control stick and easily flyable craft. Described were details of the control—the dual overhead slicks and aerodynamic servo (control rotor) to damp out oscillations.

Other vital rotorcraft engineering phases were analyzed in **"Testing of Rotors for Fatigue Life,"** by **Jonathan Wilcox, Prewitt Aircraft Co.'s consultant;** and **"Reduction of Vibration"** by **Walter Gerstenberger, United Aircraft's Sikorsky Div. chief vibration engineer.**

Heading the instruments Session was **"A Pneumatic Method for Measuring High Gas Temperatures"** by **D. W. Mann, engineer in charge, Fairchild Camera & Instrument Corp.** Proceeding on the theory that measurement of temperature in turbojet rocket ramjet, and other thermodynamic power plants is a vital requirement in securing efficient engine operation and assuring safety of engine and airframe, the paper described a method seen as extremely dependable and applicable to large gas turbines presently under development.

"Flight Path Control," by **P. A. Nasen, senior engineer in charge of automatic pilots, Eclipse-Pioneer Div., Bendix Aviation Corp.,** discussed factors involved in designing a practical automatic system for air navigation by radio, including stability, airframe antenna location, operating procedures, limitations caused by passenger comfort considerations, etc. Commercially available equipment with current radio systems were seen as providing substantial improvement in airline schedules.

In **"Machmeters for High-Speed Flight Research,"** by **Herbert Schaefer, project engineer, Kollsman Instrument Div., Square D Co.,** various types of this instrument were described, and design details of the intricate and newly developed transonic Machmeter were given. Design of transonic and supersonic Mach devices were considered in the light of particular difficulties encountered because of very high differential pressures at supersonic airspeeds.

Describing a method whereby limitations in earlier methods of evaluating airplane system dynamics can be successfully overcome, **"Application of the Performance Operator to Aircraft Automatic Control,"** by **R. C. Seamans, Jr., director tracking Control Project, MIT; B. G. Bromberg, Ma-**

Donnell Aircraft Corp., and **L. E. Payne of Jackson & Moreland,** presented a procedure which permits not only the system parameters but also those of components parts to be readily obtained so that dynamic response characteristics can be determined for an existing design for a modification or for a system in the design state. Used was a mathematical concept developed by Draper called The Performance Operator, expressing relationship between system output and the forcing function responsible for the output.

In the Flight Propulsion Session **"Problems of Gas Turbine Propeller Combinations"** by **Frank W. Davis, Convair's assistant chief engineer** outlined initial flight testing of the General Electric TG-100 and discussed many problems encountered which must still be solved as turboprop development continues—starting control, feather lag, vibration, and others. Studies were described as indicating that conventional satisfactory for use with gas turbines) that constant speed props and governors are not new methods of propeller control, such as by torque rather than rpm are needed; new standards of prop balancing are required; and that improvement in temperature control, starting, and service life are particularly necessary.

Completing the Flight Propulsion session were papers **"Application of Gas Turbines to Aircraft"** by **Arthur N. Tifford, of Westinghouse's Aviation Gas Turbine Div.;** **'Method for Handling the Performance of a Propeller and Its Match to a Powerplant'** by **J. P. Greenfield, E. T. Jansen, and J. L. Cooley, Research Department, United Aircraft Corp.;** and **"NACA Investigation of Gas-Turbine Blade Cooling,"** by **H. Ellerbrock, Flight Propulsion Research Lab., NACA.**

Leading off in the Air Transport session was **"The Automatic C-54"** by **James Aoust, All-Weather Flying Div., Air Material Command**—which carried the prediction that in the next few years the use of automatic control of aircraft will demonstrate superiority over manual control by increase in margins of safety and the operation under blind flying conditions. Stressing the fact that with modern aircraft even the most skilled pilot is severely taxed probably to such an extent that the margin of safety over human failure is dangerously small under blind flying conditions, the paper explained that a prototype automatic flight controller accomplishing elementary automatic flight has been built to reduce pilot's responsibility for detailed aircraft control, and that successful trans-ocean and trans-continent flights have been made with this equipment. The instrument was described as affording a means for progressive evaluation of newly developed systems in an integrated form.

"Research Toward Greater Airline Passenger Comfort," by **K. R. Jackman, Convair's chief test engineer** described the important problems of aircraft noise reduction and comfortable seating. Described was how Convair has found that acoustical comparison of numerous new cabin lining and trim materials on the ground, will save much expensive flight time and yet can be correlated with noise levels measured aloft. Also analyzed were acoustical contrast between soft and hard (plastic) interior trims, between additional layers of Fiberglas and its equivalent weight in mica skin damping, and between Fiberglas blankets at various fiber sizes. Additional description covered the current lightweight Convair double passenger seat and, and such test aids as "dynamic cyclar" to accelerate lifa tests on seats and cushions; the Single and Multiple Inclinators for spring-rate determination and the 'Vibrindex' and 'Ridemeter' to ride characteristic identification.

Results achieved in three years of lab research on Mt. Washington to obtain data on best preflight evaluation of experimental deicers and to provide a station where all theories of ice formation and its removal could be accurately checked was discussed in **"A study of Wing De-Icer Performance on Mount Washington,"** by **D. L. Loughborough, H. E. Greene, and P. A. Romm of B. F. Goodrich Co.'s Physical Research Laboratory.**

In the Meteorology Session **"Electric Field Intensity Inside of Natural Clouds"** by **Ross Gunn, director of physical research U. S. Weather Bureau** was represented as bringing together for the first time reliable statistical data on actual magnitudes on electric fields measured inside thunder clouds and ordinary clouds. Electric fields up to 1,500v/cm were stated as being extremely common inside actual thunder clouds—about half the field actually measured in flight when the investigating airplane was struck by an active bolt of lightning. Results show that the field, hence the hazard is greater just inside the cloud than just outside at substantially the same point and that the electric field and probability of a lightning strike are maximum within the cloud, near the freezing level. Other measurements show that fields in ordinary clouds never exceed 10v/cm unless convective activity within the cloud is present.

Three other papers at this session were interrelated—**"Preliminary Results of Detailed Studies of Thunderstorms,"** by **Horace R. Byers; "Structure and Dynamics of the Thunderstorm"** by **Bonnie R. Braham; and "Details of Surface Discontinuities Associated with Thunderstorms"** by **Roger Mosers**—all three authors being associated with the **U. S. Weather Bureau Thunderstorm Project.** Outlined were results of two summers of intensive observation in central Florida and southwestern Ohio with airplanes making a total of 1,363 traverses through active thunderstorms. The papers described the main features of the thunderstorm as an internally circulating mass of cloud air. It was explained that the storm or particularly the cells go through a life cycle starting as upward streams of rising warm air. After rain has developed, downdrafts concentrated in the rainy areas are present. These vertical movements are reflected at the surface in the form of sudden wind squalls, temperature drops and bursts of rain. Used in the study was a micro-network of 55 surface instrument installations. It was further explained that air from the surroundings flows into storm mainly at upper levels although an outflow may occur at the surface and at heights above 25,000 ft. Described as a new finding is that rain itself is an important element in the thermomechanism.

Other papers presented at the Meteorological Session included **"Significance of Rocket Research in the Upper Atmosphere for the Meteorologist and the Aeronautical Scientist,"** by **J. Kaplan, University of Cal.; 'Cloud Seeding and Self-Propagating Rain and Snow Storms,"** by **Irving Langmuir, associate director, G. E. Research Lab.; and "Methods for Detecting Ice Nuclei in the Free Atmosphere"** by **Vincent J. Schaefer, G. E. Research Lab.**

Delivered at the Aircraft Design Sessions was **"External Sound Loads of Aircraft,"** by **Thomas M. Edwards, R. L. Fields, G. L. Pierson, and Fell Kangas, Civil Aeronautics Administration.** Reputed to the first comprehensive quantitative study of noise actually produced by aircraft and other sources in residential communities, the paper provided results of extensive sound level measurements in airport vicinities with craft varying in size from small private-owner types to large four-engine commercial types. Sound readings were taken under a variety of conditions and at different distances from airplane paths. These data are presented so they may be applied to specific airport locations to obtain close estimate of existing sound levels. Discussion also dealt with effect of ground and atmospheric conditions on sound propagation.

(To be concluded next issue)

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New Rotor Suppresses Vibration

Single-lifting four-blade design affords increased smoothness. Better endurance, reduced maintenance features are embodied.

By GILES N. MONTGOMERY
(Engineering Staff, Doman Frasier)

All too frequently—in rotorcraft mechanisms, as well as in other devices—"good" solutions pose additional problems.

Thus, in conventional 'copter design, though the flapping hinge or the universally mounted hub is introduced to cope with vital considerations of control and blade stressing, these units, in turn, bring the disadvantage of coriolis effect (discussed in the preceding article—Jan 26 AVIATION WEEK)

• **Drag Hinge**—To overcome this destructive effect of coriolis on the flapping hinge rotor it is necessary to provide a means for each blade to displace itself laterally. The only solution that has proven feasible for this is to place another hinge at the root of the blade, with a vertical axis. The blade is now attached to hub with a complete universal joint and may always take a position, in its path around the craft, that will preserve dynamic balance. Aerodynamic drag trying to hold the blade back will be offset by centrifugal force holding the blade out.

However, here again, a heavily loaded bearing is required, oscillating through 2 or 3 deg., as is encountered in the flapping hinge.

The Doman rotor is not faced with this problem because no drag hinge is required.

• **Ground Resonance**—The drag hinge was a very neat solution to the coriolis problem. But unfortunately, each solution used in the flapping hinge rotor seems to bring a new problem—and the drag hinge is no exception. It subjects the craft to the phenomena of "ground resonance"—long a bugaboo of the rotary wing industry. Inasmuch as the drag hinge will permit the blades to displace themselves one from the other, the entire rotor can very easily become centrifugally unbalanced. Depending on rotor speed and the frequency of the landing gear and tires, a dance from one wheel to the other may be set up. Thus ground resonance, also the very destructive ground instability in which the dance of the wheel and the mispattern of the rotor aggravate each other, may ensue. With true ground instability the craft may turn over on its side in four seconds.

A number of things must be done in the design of a hinged blade 'copter to minimize these instability problems, but most vital is the incorporation of some form of damping device to suppress the motion of the blade about its drag hinge. This is intended to prevent build up of the phenomena to destroying proportions.

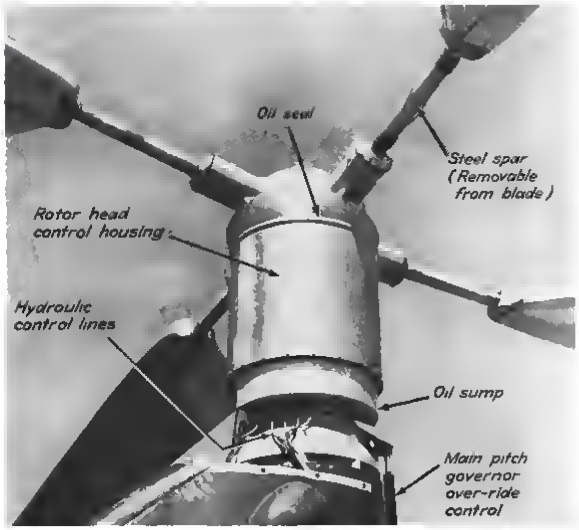
The Doman rotor has no drag hinge and is therefore not susceptible to the condition. Conceivably, the very flexibility of the blades might allow some semblance of ground resonance to develop, but in actual practice the blade stiffness is such that the condition cannot occur.

• **Blade Damper**—To suppress motion of the blade on its drag hinge to guard against ground resonance, most designers have incorporated hydraulic dampers from the blade to rotor hub. These must be perfectly matched to prevent rotor roughness. They will probably always remain a plague to service.

There is another and very serious consideration. If a device is used to suppress motion of the blade about the drag hinge, the very purpose of the latter is defeated. The drag hinge was incorporated to relieve coriolis stresses, but now with the drag hinge restricted by a damper the coriolis force comes right back into the blades.

The designer is forced into a compromise of supplying sufficient damping to ward off ground resonance and yet keep the blade shanks within reasonable stress limits. On large craft this compromise requires that the damper be equipped with a relief valve which will momentarily free it when sudden applications of cyclic pitch bring on large coriolis forces. That the pressure setting for these relief valves can be high enough for ground resonance protection and yet have the damper soft enough to prevent high blade stresses is a moot question.

The principles used in the Doman rotor make the damper unnecessary—because no drag hinge is used in its construction.



Doman rotor system. Hub tilts above oil seal to align with tip path plane. Azimuth plate and hydraulic control mechanism in housing are pressure-oil lubricated. Spars are secured to hub with preset coning angle and drag angle offset.

• **Center of Gravity**—In a single rotor 'copter the center of gravity of the craft can be correct for only one attitude of flight without using cyclic pitch. For example, if the C.G. is directly under the rotor, the craft can hover without requiring the rotor to be tilted. For 100-mph forward speed, the rotor must be tilted forward a certain amount and yet have some reserve tilt available to handle gust conditions. Because of the coriolis effect on a flapping hinge rotor or the universal joint effect on a conventional gimbal mounted rotor, the blade stresses increase as amount of inclination of the lift vector increases.

Had the aircraft C.G. in the case being considered been one inch back of the center of the rotor, a compensating amount of forward tilt of the rotor would have been required for hovering. This added amount would also be necessary for the 100-mph condition and hence the blades would be stressed that much more. Because of this condition, the allowable C.G. travel to handle varying passenger or cargo loads is very limited. On single rotor 'copters for which information is available the limits are in the neighborhood of four or five inches. By the time the craft is built large enough to carry four people, this limited C.G. allowance severely hampers utility.

This confined C.G. travel, more than any other factor, has limited the single rotor 'copter to the 6,000 lb. gross weight class. The trend for larger machines has been to take the two rotor, fore and aft, configuration with all the associated expense and complexity.

Because of the constant velocity universal hub mounting in the Doman head, there are no stress increases through any amount of rotor head tilt. The only limit to C.G. loading of the craft is that of the main blades striking the tailcone or the tail rotor dragging the ground on landing. With the Doman configuration a multi-place single rotor 'copter of 14,000 lb. gross weight may be constructed. This is about twice the gross of any presently flying single rotor craft. Beyond this weight, the power required of the tail rotor in hovering becomes too great.

▪ **Blade Endurance**—There are other factors beside the coriolis effect that subject the blades to vibratory bending moments. The high lift that the blade is subject to on the advancing side in forward flight is primarily cancelled by the feathering action resulting from cyclic pitch change. In forward flight, the pitch of the advancing blade is reduced. The drag increase on the advancing side, however, will be only partially cancelled by cyclic pitch.

In addition to this, however, there will be a 2 per rev. lift and drag fluctuation on each blade in forward flight. Source of these stress producing force fluctuations is somewhat obscure. Mathematically it is because the equation for lift or drag on the blade involves a term containing the sine or cosine of twice the rotational angle the blade makes with the front of the craft.

These fluctuating forces on the blade, plus forces arising from gusts, pull-ups, blade center of pressure excursions, and any number of other sources will all contribute to shorten blade endurance life. The Doman rotor is the only one introduced to the public, which has an answer for this problem other than to beef up the parts.

If a force of a given magnitude is applied to the rotor blade once, the blade will deflect a given amount and a given stress in the blade root will be produced. If the same force is applied at equal intervals, of say once every two seconds, the blade will deflect further with each impulse than it did when the force was only applied statically. It will have a correspondingly greater stress at the root. If the frequency of applying the given force is increased further the deflection is again increased with the root stress further amplified. Each increase in the frequency will produce an increase in the stress until at the natural frequency of the blade only a very small force need be applied to soon break the blade.

By making the blade very stiff, which usually means heavy, the natural frequency may be made very high. The frequency of the 2 per rev. forces acting on the blade will be very low by comparison, and hence have low amplification values. They will always, however, produce a greater stress than the same force applied statically.

The Doman rotor uses a different approach to this problem. Consider applying the forces to the blade at a frequency higher than the natural frequency of the blade. The deflection and stress start to come down again. In fact, if the applied force frequency is high enough, the deflection and stress will be much less than if the same force were applied statically. This principle is used in designing the blades on the Doman rotor. The frequency of the applied vibratory blade forces and the designed natural frequency of the blades are such that the stresses are much lower than were the same forces when applied statically. For this purpose the blade has a very low natural frequency and hence is limber and of lightweight construction. The flexible blade also exhibits excellent stress suppression qualities under gust loads and pull-ups.

Use of this principle plus complete absence of any coriolis or universal joint effects enable the Doman rotor, flying on a 'copter of 2,500 lb. gross weight, to fly at 100 mph with vibratory blade

(Continued on page 27)

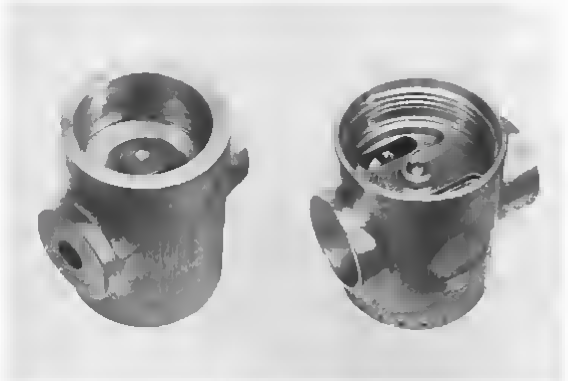


Fig. 1. Shown at left is hub forging which has been partially machined, for comparison with finished hub (right) comprising former design on Aeromatic Model 220 prop.

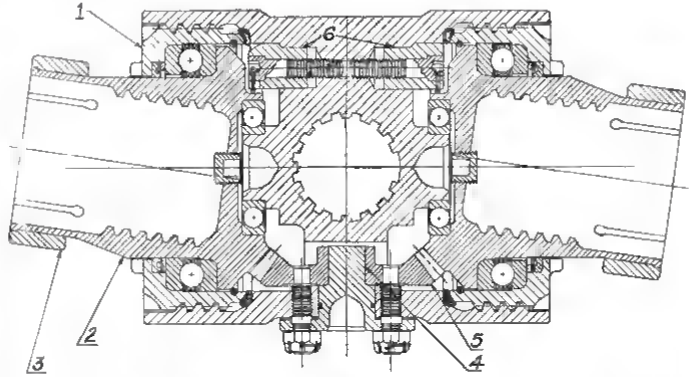


Fig. 2. Section of components in former forged 220 design. Parts are: (1) Nut, (2) flange, (3) counterweight clamp, (4) synchronizer shaft, (5) synchronizer, and (6) pitch setting stops, limiting angular travel.

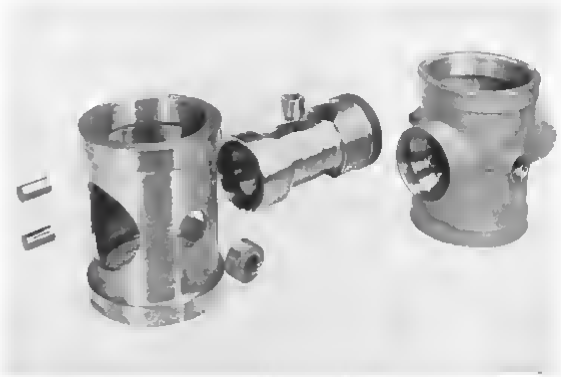


Fig. 3. At left are seen components required for fabrication of present arc-welded Model 220 design. With parts assembled and welds ground, complete unit is shown at right.

Aeromatic Welding Procedures Lower Hub Costs

Propeller hubs of arc-welded tubular design slash weight, fabrication time, and expense.

Recent research into propeller hub manufacturing techniques has indicated that present methods of machining hubs from steel billets are not only expensive and wasteful but impose unnecessary weight penalties on the entire assembly.

To simplify procedures, the Aeromatic Propeller Div. of Koppers Co., Baltimore, makers of automatic pitch propellers for lightplanes, has been investigating the feasibility of using welded construction in place of the present machined forgings.

This project has been under the direction of Paul F. Hackathal, chief engineer; C. C. Mast, shop superintendent, and D. W. Hamilton, welding foreman.

Their work showed such potentialities that a paper, "Development of Arc Welded Propeller Hubs," written by these men, with assistance of John D. Waugh, public relations representative, T. F. Naylor, materials engineer; and V. B. Benfer, sales engineer, won the grand award in the James F. Lincoln Welding Foundation's 1947 contest. These contests have been acclaimed by industrial leaders for the vast amount of valuable new welding technology and practice disclosed in the award winning papers.

The hub-welding details described here are based on methods outlined in the prize-winning paper.

Early in the experimental work, it was found that a propeller hub scarcely ever broke from steady stress, which was calculable, but generally failed from the fatigue due to vibratory stress. Since the latter stress was not easily determined, and is still the source of much investigation, enormous safety factors in terms of metal bulk were built into propeller hubs.

The finest high alloy steel forgings obtainable became the generally accepted hub material. These huge forgings represented high cost from start to finish and still do as in the case of a present high horsepower hub, which as a pierced forging weighs approximately 300 lb. and is machined down to about 50 lb. However, high structural integrity has been achieved, and retention of blades against centrifugal loads of 75 tons and more is no longer a problem with the large propellers. It is the effect of this accepted, and now traditional, method of high power-absorption hub construction on the design of low horsepower propellers, which provides a basis for this comparison.

Welding for hub fabrication among numerous developers apparently just wasn't considered because of the view that welding would not be strong enough for this very highly stressed part; also, forging was the only practice in successful use. The one, notable, exception taken to this view is embodied in the manufacture of the present Aeromatic variable-pitch propeller hub.

▶Hub Development—The original steel hub forging (on Model 220), with some preliminary machining completed, is shown in Fig. 1 with the finished machined and ground hub. The forged billet of chrome-moly steel weighed 64.7 lb. and was machined to a finished weight of 17.8 lb.

Design characteristics of the finished hub include the large cylindrical socket into which the blade retaining flange and retaining nut fits and the cross bore through the hub center which is splined to fit a particular size engine shaft.

These two principal bores must have an accurate dimensional and high strength relationship because of the retention of the entire centrifugal and bending loads of the blades by the large cylindrical hub socket, and the engine driving torque by the shaft bore. Other integral features of the hub shown are: Buttress threads for blade retaining nut; boss in base of hub socket to position the blade journal bearing, aperture through side of bub wall for a shaft, and a milled slot from one socket to the other to accommodate a gear to synchronize blade movement.

These features are indigenous to the Aeromatic propeller design in that they comprise all principal hub features in the absence of any actuating mechanism requiring auxiliary power.

Controllable pitch propellers may have similar basic hub structures with pitch change mechanisms added. But, in the absence of the servo devices, the retention of blades so they may rotate, adjustable stops to limit their movement, and a synchronizing means comprise the total basic hub requirements.

Fig. 2, a cross-section of the forged steel hub, shows the relative positions of principal and detail parts. Inclined blade retaining flanges are shown mounted on a radial journal bearing fitted to the hub boss and retained by a buttress-threaded nut and ball thrust bearing. Synchronizer gear is held in place between teeth on each flange by a synchronizer shaft bolted to hub wall. Blade pitch setting stops, which limit angular travel of the blades, are fitted into drilled holes in a milled slot in blade socket base. These pitch setting stops were in an inconvenient spot in this design. Changing their settings is a procedure which must be performed repeatedly when the propeller is being adjusted to control engine speed accurately. Removal of the entire blade assembly, each time adjustment becomes necessary, entailed considerable time.

Such features, in addition to the disadvantage of carving the whole hub out of a forging, could be improved only by an entirely new design fabricated by another method.

Since steel castings had demonstrated weakness, and aluminum alloy forgings, though light, were virtually as expensive to machine as steel and also would fatigue, welding was the apparent solution although it had never been used in this particular application.

▶Design for Welding—In the breakdown of the 220 hub for welding, the barrel and cross tube, shown in Fig. 3, were machined from seamless alloy steel tubing. To expose the pitch setting stops for adjustment, bosses made from bar stock were designed to be welded into holes in the hub barrel wall and threaded for externally accessible bolts. Synchronizer shaft which had previously been bolted to the hub wall was to be threaded into a boss machined from bar stock and welded to hub wall. With the cross tube welded into hub barrel, the boss for positioning the inner journal bearing (also machined from bar stock) could be welded to the cross tube.

To balance the assembly, a simple piece of curved plate would be welded to the inner hub wall. Threading the inner lip of the hub barrel for a retaining nut was eliminated by using an internal expanding snap ring in a groove. Manufacture of these parts was far less costly than a forging and its machining. Substantial weight reduction was possible because superfluous metal, not removable economically from the forging, if at all, was absent with the tubular construction.

Hub barrel and cross tube of the present design are machined from electric-furnace aircraft-quality seamless steel tubing (SAE 4130) purchased in finish annealed condition. Both hot finished and cold drawn tubes have been welded with success. The bearing boss, welded to the crosstube, is 4130 steel. Synchronizer boss, pitch stop bosses, and balance weight are all SAE 1020, normalized. These parts, shown in Fig. 3, may be referred to in the following welding sequence.

▶Welding Steps—Cross tube is positioned through holes bored in hub barrel in a jig holding the balance weight against hub inner wall, and synchronizer boss in position in hub wall. These components are then atomic-hydrogen tack-welded, making smooth shallow tacks that may be passed over with an arc later with no perceptible rise or slag. The tacked assembly is preheated to between 500-600 deg. F., then placed in a positioning jig. A fillet weld is made first at junction of cross tube and hub wall, externally, with a $\frac{5}{32}$-in.-dia. Planeweld No. 1 electrode using approximately 130 amp.

After this the hub is normalized for ½ hr. at 1,500 deg. F. and cooled in still air. It is then shot-blasted with angular shot, the welds ground, and holes drilled in hub wall to receive pitch stop bosses; the transverse hole in the cross tube is reamed to receive the bearing boss. This intermediate machining is necessary so that stresses in the welds of smaller parts, yet to be added, are minimized.

Stop bolt bosses are now fitted into the holes in hub wall and atomic-hydrogen-tacked in a jig. Bearing bosses are pressed into cross tube and hub is again preheated to 500-600 deg. Welding is accomplished with $\frac{1}{8}$-in. electrodes laying a fillet bead at one pass around each boss on external surface of bub wall.

Penetration of the weld at the bosses

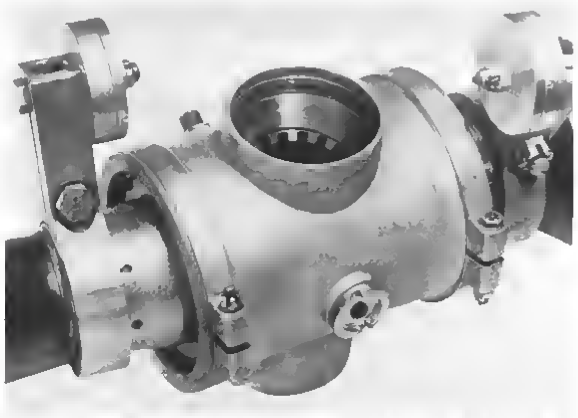


Fig 4. This is experimental version of Model 220 hub on which all welding is accomplished internally in order to eliminate time-consuming and costly bead grinding procedure.

is not required to be as great as that of welds at either end of cross tube because they do not carry appreciable loads. Cross tube to hub barrel weld, however, does carry substantial shear stress due to torque and must be entirely free from defects which torsional vibration could aggravate.

Following final welding, hub is again normalized and heat treated. It is quenched in oil at 1,550 deg. and drawn at 1,020 deg. for 4 hr. After final shot blasting, hub is Brinell tested for a 250-276 reading and given a ferro-magnetic inspection check before grinding and final machining.

Tubular hub components receive a good turned finish initially so only the weld bead needs blending attention. A splatter-proof coating reduces adherence of weld particles and subsequent shot blasting removes particles that stick. Slag is also removed by shot blast, eliminating hand removal for any purpose other than exposing the end of a bead for continuance of welding or for weld inspection.

Welds are ground with coated wheels and Carburs, the blended area extending approximately ¾ in. on either side of weld. After grinding, hub is thoroughly inspected by the wet magnetic method for cracks, slag inclusions, or excessive porosity.

The welding technique of experienced operators is so highly developed that rejections are unbelievably low and not comparable to machining rejections in quantity.

Welded jigs are freely mounted and counter-balanced so they may be swiveled by light touch with no tendency to produce irregular motion. Heavy universal jigs were found to lag or jerk from friction of weight and inertia, preventing steady rotation and smooth tilting during welding.

As time figures will show, welding of this hub, while of a precise and critical nature, has been reduced to a repetitive technique that may be conservatively considered to have no known parallel in its class.

► **Experimental Trend**—A current experimental development is shown in Fig. 4—Model 220 hub welded internally, object being to eliminate weld grinding completely and accomplish a new disposition of the pitch stop bolts by dispensing with their bosses.

As previously noted, the cross tube was welded to hub barrel at front and rear, the synchronizer shaft boss was welded, and four bosses also welded, all externally, into hub wall holes. Grinding naturally entails time and cost, particularly around pitch stop bosses. By making all pitch stop boss welds internally, no structural change is necessary and cost savings are reflected.

The balance weight (previously a small thick block) was made out of thinner plate covering a greater area of the hub wall and welded in place as before. This gives greater wall thickness through which pitch stop bolts may be threaded without supporting bosses. Potential advantages of eliminating the four machined pieces merely by inclusion of a larger weld plate indicates the extent of total benefits which may become possible with arc welded fabrication.

This development—quite new and still undergoing extensive test—is offered primarily to emphasize fabrication versatility and design latitude permitted by arc welding. If it should supplant the current production hub, there would be no machining jig changes, only one drill jig change, and only slight modification in arrangement of welding jig. Thus, what could be an expensive engineering change, considering machining methods, can result in a beneficial modification with immediate savings.

► **Cost Considerations**—The cost and weight data are consolidated in Table I, to show exact extent of savings realized with arc welding versus forging. Total figures are given in all instances because details vary and are superfluous for this study. The 42.8 percent cost reduction determines the price and extent of the market more than any other factor. However, weight saving of 31.5 percent is almost equally important due to its influence on total aircraft weight, and can be applied to the personal plane in terms of increased performance without the increased cost of greater horsepower.

Indirect benefits, such as greater baggage capacity, become factors of utility which are competitive points within the industry.

The first ground-adjustable hub, machined from a solid forging, is shown in comparison to the present arc welded hub, in Fig. 5.

Breakdown of the ground-adjustable design for welding is extremely simple. Hub barrel consists of a single tubular piece slotted on each end, threaded internally and has a cross tube, each end of which is almost as large as the hub barrel. These bell shaped ends on the cross tube accommodate front and rear cones and the retaining nut which secures hub to shaft. By making the cross tube from two pieces, each extending halfway into the barrel bore, it was possible to maintain a smaller barrel diameter than would have been possible were the cross tube made from one large section.

Barrel diameter with this arrangement is held at a minimum, wall thickness is easily controlled, and weight is exceptionally low.

Method of welding this hub consists of making a fillet weld at one pass around both front and rear of the barrel at junction of entry of each half of the cross tube. The cross tube halves meet in the center of the barrel bore where their mating, step cut, ends are pressed together. Weld beads are made with a ⅛ in. Planeweld electrode.

The process steps follow very much the same pattern as the welding on the 220 hub. Grinding of the weld beads is the only operation consuming appreciable time, but a design to make the welds internally may eliminate this. Joint of the cross tube ends in the center of the barrel is not welded because it is not necessary.

In every instance the welds on all hub designs are as strong or stronger than the parent metal and have given no difficulty in service. The fact that a given weld does not penetrate the wall of the hub, or an opposing weld is lacking, is not of great importance because destruction tests, theoretical studies, and vibration tests have demonstrated the efficacy of the simplified process used.

Table II figures on ground-adjustable hub manufacturing cost, time, and weight apply specifically to the 65 hp. forged and the 150-hp. welded design because they best illustrate the gain with welded construction. Close relationship of all figures is deceiving unless the increased horsepower application of the welded design is noted. It is only through the use of arc welding that it is possible to manufacture the adjustable model on an economically practical basis.

Summation of the overall benefits of production arc welding of Aeromatic propeller hubs is best expressed by the fact that the company will save in excess of $205,000 on direct labor and raw material this year at the present rate of production.

Arc welding the principal component permits use of tubes, drop forgings, and simple machinings attaining a cost reduction impossible with any other practical process. Flexibility of manufacture afforded by arc welding permits disposition of all adjustment devices externally, so the inner works need not be disturbed for minor adjustments and subsequent minor design changes can be made with no appreciable tooling cost.

Successful application of arc welding to a flight component, whose strength requirements most aircraft engineers respect, should dispel doubts as to strength characteristics of arc welding and impress lightplane makers with selling price reductions possible. For, only this way will we realize an ever wider acceptance of the personal plane.

Table I.—Cost-Weight Data

Forged vs. Welded—Hypothetical Production—Model 220

	Raw Material Weight	Raw Material Cost	Standard Machine Time Man-Hours	Direct Labor Cost	Total Cost (Including Burden)	Finished Hub Weight
Forged Hub	94.7 lb.	$10.36	16.4	$80.50	61.61	17.8 lb.
Welded Hub	47.1*	6.50**	9.1***	11.38	35.25	12.2
Gross Saving	47.6	3.86	7.3	9.12	26.36	5.6
% Savings	27.3	34.4	44.6	44.6	42.6	31.5

*Includes 1.2 lb. Planeweld No. 1
**Includes $.14 welding electrode cost.
***Includes 5.6 hrs. welding time
Note: Burden means direct labor with all overhead and operating costs included

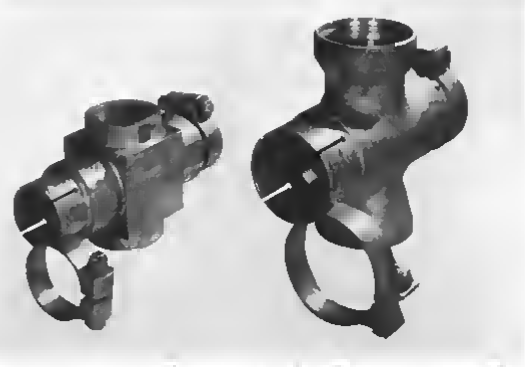


Fig. 5. Forged design, ground adjustable hub (left) is applicable to 65 hp. installations, while present tubular welded design (right) is suitable for 150 hp. engine applications.

Table II—Cost-Weight Data

Forged vs. Welded—Ground Propeller Hub	Adjustable
	65-hp. Forged	150-hp. Welded
Raw material weight	26 lb.	32.6 lb.
Raw material cost	$4.60	$5.22
Finished weight	6.3 lb.	6.7 lb.
Machining time	4.9 hr.	4.1 hr.
Total Cost (Including Burden)	$16.61	$18.03

Doman Rotor (from p. 22)

stresses of less than one tenth of their endurance limit.

• **Bearing Endurance**—Maintenance has proven to be an expensive part of 'copter operation. Poor bearing life is one of the major factors. With exception of the feathering bearings carrying centrifugal thrust of the blades, there are no heavily loaded bearings in the Doman rotor, and these blade thrust bearings are unloaded in flight by hydraulic oil pressure. The entire rotor mechanism is contained in a housing which permits all of the parts to be pressure-oil lubricated. Bearing problems are precluded under these conditions.

• **Aircraft and Control Roughness**—In forward flight the individual blade is subject to varying lift changes and pitching moments. Each blade will have a very high 1 per rev lift and pitching moment change, a reasonably high 2 per rev change, and a small change occurring at 3 per rev. There are also higher orders of changes, but they involve insignificant energy.

Lift variations will shake the aircraft and the blade pitching moments will shake pilot's control stick. Insofar as fuselage and stick are concerned, it is fortunate that the phase relationship of the forces on one blade will cancel some of the forces on another. The greater the number of blades the more the cancellations.

On a one-bladed rotor there will be no cancellations.

On a two-bladed rotor the 1 per rev lift variation cancels. The 2 per rev lift change adds to shake the aircraft at this frequency. The 1 per rev pitching moments on the blades add to shake the control stick twice every rotor revolution. The 2 per rev pitch change does not molest the control stick, but it does jerk the collective pitch control.

On a three-bladed rotor, both the 1 and 2 per rev blade lift changes cancel. The 3 per rev, however, adds. The 1 per rev blade moment change places a steady side force in the control stick. The 2 per rev moment changes shake the stick at 3 per rev.

On a four-bladed rotor, 1, 2, and 3 per rev lift changes cancel. There is complete cancellation for 2 per rev blade pitching moment fluctuations. The 1 per rev gives steady force on stick.

The Doman rotor employs four blades. It is the only single lifting rotor in the United States flying at this time, offering this feature.

Many presently flying 'copters have had to incorporate irreversible features into the controls to enable pilot to endure a flight of any length. The Doman rotor requires no such devices because of the force and moment cancellations made possible by using four blades.

NEW AVIATION PRODUCTS

Airport Rotating Beacon

A low-cost, low-maintenance, 100,000 cp rotating beacon is announced by **Westinghouse Electric Corp.**, P. O Box 868, Pittsburgh 30, Pa. Available for lighted or unlighted small airports or for small seaplane bases, device is equipped with transfer relay so that if service lamp burns out, auxiliary lamp is

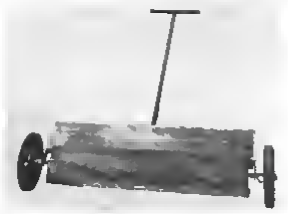
turned on instantly and indicator contact is closed to give warning that service lamp must be replaced. Relay resets automatically when service lamp is replaced or in accidental trip-out of switch during maintenance. All exterior metal parts are finished in CAA color requirements. Beacon is totally enclosed under rubber gasketed glass dome and is represented as not affected by sleet, rain, or temperatures from —45 deg to 130 deg F. Two identical optical systems, each with four doublet lens arranged in pairs project two concentrated beams 180 deg apart for 10-mi. visibility under normal flying conditions when 500w airway beacon lamp is used. Color lenses are available conforming to requirements of Specification AN-C-56, Type I, Grade D. Beams can be adjusted from 0 to 12 deg above horizontal as required. Revolving beacon operates on 115v, 60c supply. Weight is under 100 lb.

Records Engine Power-Hours

Functioning as practical means for determining time for aircraft engine servicing, "Power Recorder," developed by **Kollsman Instrument Div.** of Square D Co., Elmhurst, N. Y., gives cumulative power-hour units turned out by engine, thus providing indication of total engine wear. Device, also applicable to aircraft rental operations, computes total power hours produced by continuously measuring engine speed and manifold and atmospheric pressures. Power data are obtained in accordance with engine power curves for all throttle and propeller pitch settings and altitudes. Rate at which power units are registered is directly proportional to power-hours delivered by engine and results are given in terms of equivalent hours at cruising power, registering 100 units per hour if craft is flown at normal cruising power. Two types of recorders are offered, one with flexible shaft connection to engine tachometer outlet, other being remote operating type electrically driven by tachometer generator. Apparatus prints cumulative power units and engine identification number in timeclock fashion so that record may be filed for reference. Visual counterpart indication is also available.

For Scrap Pickup

Suitable for use in aircraft plants and at airports is Cesco magnetic sweeper designed to remove scrap metal and nails from manufacturing areas, loading yards, and airstrips. Made by **Columbia Engineering Service Co.**, 593 Market St., San Francisco, Cal., unit is available in sizes from 12 to 72-in. sweeping widths. Series of permanent Alnico magnets are mounted on alloy steel axle with rubber-tired ball bearing wheels. Canvas cover fastens to retainer pan, passing over assembly and under magnets, where it is held in place by small steel rod in end of canvas. When magnets are loaded, magnetic assembly,



pivoted on axle, is turned up, operator taking hold of metal rod in free end of canvas and pulling back toward handle until pickups fall into pan.

Electric Impact Nut Setter

Represented as heavy duty, high speed unit, portable electric impact nut setter, Speed-o-matic, is offered by **Illinois Gage & Mfg. Corp.**, 4639 W. Washington Blvd., Chicago 44, Ill. Torque-less device, stated not to twist in operator's hands when nut becomes tightened, drives nut or bolt 1,750 rpm. at free speed. At point of resistance, impact unit automatically delivers 3,000 impact blows per min. Instantly reversible, device is equipped with 25 ft. of cord and plug with ground wire. Operation is on 110v., 60c., a.c. or d.c. Length is 12½ in., weight, 13¼ lb. Capacity is up to ¾ in. bolts or nuts.

Information Tips

Analysis of Grinding Defects

For aircraft machine shop personnel and inspectors, new booklet published by **Norton Co.**, Worcester 6, Mass., is up-to-date and complete treatment of available information on subject. "Injuries in Ground Surfaces." Publication features many photographs which show clearly numerous types of defects, such as cracks and burns found in ground surfaces. Makers of tool steel tools, dies and hardened steel parts have found information helpful and metallurgists will find value in information on detection of injuries and attendant trouble shooting.

Bronze Electrode Welding

"Welding with Ampco Bronze Electrodes" is new bulletin W-17 issued by **Ampco Metals, Inc.**, Milwaukee 4, Wis., containing factual information on how to weld wide variety of alloys using bronze arc welding electrodes. Included is detailed information on welding procedures and techniques as well as comprehensive charts listing alloy types, specifications, chemical compositions, physical properties and weldability values.

Ignition Harness

New line of wiring harness, custom-built especially for plane on which installed, is announced by **Coldwell Industries Inc.**, Kent, Ohio.

Plant Accessories

Folder issued by **Yale & Towne Mfg. Co.**, Philadelphia Div., Phila., 24, Pa., lists various production-facilitating devices. Included are industrial and lift trucks, hand and electric hoists and dial scales.

Weathering Tests

New ranges of prices for Weather-Ometer tests, method of testing for determining resistance of textiles, paints, plastic materials, and coated fabrics is announced by **United States Testing Co.**, 1415 Park Ave., Hoboken, N. J.

16,023 Personal Planes Sold During 1947; Value $53,206,000

Forecasts of 1948 market vary from 8,000 to 20,000 planes, with trend to buying four-placers considerably stronger. Dollar volume may rise.

By ALEXANDER McSURELY

A total of 16,023 planes, with manufacturers' value of $53,206,000 sold by principal American personal plane makers in 1947, compares with 1948 sales forecasts ranging from 8,000 to 20,000 planes. Majority of available forecasts expect the 1948 total to be below or at best at the 1947 figure, but it is also thought that increased sale of four-place planes will bring dollars per plane up.

Dwane Wallace, president of Cessna Aircraft Corp., Wichita, and chairman of the Personal Aircraft Council, Aircraft Industries Association, points out that although the 1947 total is less than half the number (35,000) of planes sold in the first full postwar year, 1946, it is still nearly two and a half times as many planes as was sold in the best prewar year, 1941.

▶**Four-Place Trend**—Trend toward larger planes and away from two-placers is already well established in the 1947 total figures, which show that 8,038 three- and four-place planes were sold as against 7,940 two-placers.

This fact is significant in that it shows a buying trend toward more expensive types of airplanes because of their greater usefulness. With several additional lower price-bracket four-placers scheduled for introduction this spring and a heavy emphasis on sales of four-placers, it is indicated that four-place sales will increase, barring major economic changes.

▶**Trade-In Problems**—With the increased percentage of four-place sales, dealers and distributors are encountering trade-in problems with used two-placers whose owners now want larger planes. Increased margin for dealers and distributors appears necessary. It is noteworthy that Stinson, which has probably the most liberal dealer margin policy, had the largest number of sales for any one plane—2,662 for the Voyager in 1947.

Piper led the manufacturing race with a total of 3,564 planes, of which 2,158 were three-place supercruisers and 1,406 tandem trainers, most of them the new Cub Specials. Cessna was second with 2,390 planes, of which all but 69 were two-placers. After third-place Stinson came Aeronca with a total of 1,726 planes, but of these 508 were military liaison L-16s, leaving a total of 1,218 civil lightplanes sold. Luscombe with a total of 1,401 two-placers came next and also led the two-placer sales for the last two months of 1947 with 217 planes sold. Beech sold 1,209 four-place Bonanzas for a dollar volume of $7,945,000, second only to Stinson's dollar volume of $11,525,000.

▶**Reports Listed**—Other company sales reports for the year: Bellanca, 214 planes, $1,070,000; Engineering Research, 805 planes, $2,084,000; Fairchild, 16 (personal) planes, $71,000; Funk, 41 planes $155,000; Republic, 818 (personal) planes, $3,902,000; Ryan, 18 (personal) planes, $125,000; Taylorcraft, 196 planes, $366,000; North American, 853 (personal) planes, $5,021,000. Texas Engineering Manufacturing Co. made 143 Swift 125s and 66 Fairchild F-24s, $787,000.

Interesting note in total 1947 personal aircraft sales picture was added emphasis on export which increased 20 percent by units and 97 percent by dollar value over 1946 exports. The 1947 exports totaled 1,669 planes valued at $6,496,812 as compared to 1,383 planes valued at $3,298,342 in 1946. The exports were about 10 percent of total sales in number and 12 percent of total sales in dollar volume.

▶**Export Leaders**—Argentina with 385 planes and Canada with 264 planes were the largest customer countries with the bulk of the shipments to Latin American countries. These included: Brazil, 155 planes; Chile, 20 planes, Colombia, 12 planes; Costa Rica, two planes; Cuba, 27 planes; Ecuador, three planes; El Salvador, two planes; Guatemala, four planes; Haiti, three planes; Mexico, 87 planes; Nicaragua, one; Panama, eight; Paraguay, three; Uruguay, 27; and Venezuela, 12. Total exports to European countries amounted to 176 planes.

Relatively small number of personal planes going to Europe indicates that there is little real threat to personal plane sales in the recent plan announced by the Department of Commerce to reestablish war-time licensing restrictions on exports (including personal planes) to Europe on Mar. 1. Dollar shortages in most of the European countries are such that they are not likely to become major buyers of U. S. planes in the near future, whether licensing prevails or not.

SCORES MIDGET SWEEP

Bill Brennand, 20 year-old winner of last year's Goodyear Trophy race for midget planes at Cleveland, made a sweep of the major events for midget racers, by winning the first Continental Motors Trophy race at the recent Miami (Fla.) Air Maneuvers. He flew the same plane which won at Cleveland, the Wittman Special, built by Steve Wittman, Oshkosh, Wis. Photo shows C. J. Reese, Continental Motors president, presenting the huge trophy to Brennand, with the winning plane in the background.

Cessna Bids For Four-place Leadership

UNUSUAL AERIAL CLOSEUP

SLIDING FRONT SEATS

BAGGAGE COMPARTMENT

ROOM FOR FOUR IN 170

(Photos by Ross-Pix)

On an all-round basis of low price, attractive appearance, reasonably good performance with economy, and producibility, the new Cessna Model 170 now looks like "the plane to beat" for other entries in the highly competitive four-place personal plane market of 1948.

Whether the plane gets into full production early enough this year to be readily available at the peak market season will probably be a main factor in its sales record. Deliveries are scheduled to begin in March, assuming CAA certification and other delays and obstacles are hurdled according to plan. Earlier pricetag of $5,475 flyaway Wichita is unchanged.

Externally, the 170 closely resembles the two-place Cessna Model 140, although the four-placer has a cabin 5 in. wider, and fuselage 4 ft. longer. Its wingspan is 3 ft. 2 in. greater, and the tail is somewhat larger. (Wingspan is 36 ft. Length is 25 ft. 6 in.)

Interior arrangement has two separate front seats which slide to rear on tracks. Back of the rear seat folds forward for access to luggage compartment much like the Model 140 luggage hold. Sliding front seat arrangement, wide door and a "buggy step" combine to make entrance to plane easier than is the case with most of its contemporaries. Accompanying photo shows effect of sliding one seat back while pilot's seat remains in normal position. Other photos show unusual closeup flight picture of the 170, a view of the plane warming up on the ground with its full complement of four persons, and an interior closeup of the baggage compartment arrangement.

Approximately 75 percent of 170's parts are interchangeable with various parts of the smaller Cessna 140 or the big Cessna 190. Result is that Cessna dealers can stock a relatively small numerical inventory of parts and supply all three basic models at a saving to them as well as to manufacturer and presumably to consumer.

Sale of four-place planes in 1947 totaled 5925 (Personal Aircraft Council report), with the largest volume by any one manufacturer (Stinson) about 45 percent of the total. Analysts expect an increasing sales emphasis on four-placers in 1948, and a greater proportion of total sales, perhaps 70 percent, will be in this category. With estimates of the 1948 market ranging from 20,000 downward to a low of 8000, this might make the four-place market somewhere between 14,000 and 5,400 as the field for the Model 170 and competitor planes.

Reservations Defined

President Truman has announced designation of three new air space reservations in the vicinity of Clinton Engineering Works, Oak Ridge, Tenn.; Hanford Engineer Works, Richland, Wash., and Los Alamos Project, Santa Fe, N. M. Airspace above these areas is set apart for national defense and other governmental purposes so that no person shall navigate an aircraft within the airspace except in the interest of national defense or by authority of the U. S. Atomic Energy Commission.

Reservations are described as follows:

▶ **Oak Ridge**—Beginning at latitude 36° 00′ 25″ longitude 84° 07′ 05″, thence to latitude 35° 51′ 35″ longitude 84° 16′ 25″, thence to latitude 35° 52′ 10″ longitude 84° 24′ 15″, thence to latitude 35° 55′ 45″ longitude 84° 29′ 30″; thence to latitude 36° 05′ 05″ longitude 84° 13′ 30″; thence to latitude 36° 11′ 25″ longitude 84° 07′ 05″, the point of beginning.

▶ **Richland**—Beginning at 46° 33′ 40″ longitude 119° 13′ 00″, thence to latitude 46° 20′ 00″, longitude 119° 13′ 13″, thence to latitude 46° 18′ 06″ longitude 119° 30′ 00″; thence to latitude 46° 26′ 00″ longitude 119° 47′ 25″, thence to latitude 46° 40′ 45″ longitude 110° 47′ 28″; thence to latitude 46° 46′ 50″ longitude 119° 33′ 35″; thence to latitude 46° 46′ 50″ longitude 119° 28′ 16″; thence to latitude 46° 33′ 40″ longitude 119° 13′ 00″, the point of beginning.

▶ **Los Alamos**—Beginning at latitude 36° 00′ 00″ longitude 106° 04′ 00″; thence along the Rio Grande river to latitude 35° 45′ 00″ longitude 106° 15′ 00″, thence to latitude 35° 45′ 00″ longitude 106° 30′ 00″, thence to latitude 36° 00′ 00″ longitude 106° 30′ 00″, thence to latitude 36° 00′ 00″ longitude 106° 04′ 00″, the point of beginning.

CAP Radio Network

California's Civil Air Patrol Wing Week claimed leadership in CAP's national communications network.

Col. Bertrand Rhine, Wing commander, reports that the Wing has in operation 100 radio stations on USAF frequencies, 50 stations on 2374 kc, 50 on vhf frequency, and 22 mobile stations.

BRIEFING FOR DEALERS & DISTRIBUTORS

BARGAIN RIDE—A demonstration ride in a Beech Bonanza four-placer for $1.02, offered by the Rent-A-Plane Co., Spartan hangar No. 3, Tulsa (Okla.) Municipal airport, is the biggest bargain for the flying public which has come to the attention of this column in recent inflationary days. Ralph Smith, manager, reports that more than 1,000 persons have been hopped in the Bonanza. A "checkout" ride is also offered for $8, which gives the passenger the privilege of flying the plane himself from the left side (assuming he has a license.) The company also is renting Bonanzas to competent pilots at the rate of 9 cents a mile plus 40 cents an hour. In the first six months of operation since June it has flown Tulsa business men over 100,000 passenger miles into 26 states.

CESSNA CROSSWIND GEAR—Combination of the Cessna vanadium spring steel landing gear with the Goodyear castering wheel for crosswind landings is now available on two-place Cessna Models 140 and 120. Price is $340 installed at the factory plus trade-in of the regular wheels or a shipout price of $430 which does not include installation. Cessna is testing the gear on its new model 170 four-placer which uses a landing gear interchangeable with that on the two-placers, and presumably should be able to supply the new gear at optional extra cost on the 170 in the near future. When Goodyear makes larger castering wheels, Cessna plans to test them on the four to five place models 190 and 195. "The gear may seem expensive, but compared to the price of adding another flight strip on a landing field, it is very cheap," one Cessna official commented. Goodyear officials have been studying the market for the cross wind wheels very closely. If a sufficient quantity of wheels could be sold to make possible mass production economies a price drop might be in order after initial development costs, in addition to those underwritten by CAA, were paid off.

TOP CESSNA DISTRIBUTORS—Ten sales leaders among Cessna distributors in 1947 rated as follows in order of sales: **Pathfinder Flying Service, Stockton, Calif.; Mauk's Airpark, Blackwell, Okla.; Yingling Aircraft, Wichita; Aero Activities, Detroit, Airways, Inc., Des Moines; Mid States Aviation, Sky Harbor, Northport, Ill.; Aero Sales, Omaha; Camfield Aviation, Grand Rapids; Clinton Aviation, Denver and Snohomish (Wash.) Airfield.**

STANDARD STINSON EQUIPMENT—Safe Flight Indicator, Dr. Leonard Greene's stall warning indicator, has been adopted as standard equipment on the new 1948 Stinson 165 Voyager. The device, which lights a red light and blows a horn whenever the airplane approaches a stalling condition, regardless of speed or plane's altitude was developed under CAA sponsorship. Stinson owners will benefit from a reduction in insurance premiums, since several insurance underwriters now are giving reduced rates for planes equipped with the indicator. Voyager already was generally regarded as one of the safest planes to fly, due to its virtual inability to spin and its good inherent stability. Inclusion of the stall indicator is regarded as a further step toward making the plane still safer for the business man flyer, who is seen as the principal component of the market for this and other four-place planes. Voyager is second personal plane to make stall indicators standard equipment. Beech Bonanza has a company built stall indicator of a different type, as standard equipment.

MONOCOUPE INQUIRIES—Since transfer of Monocoupe Airplane and Engine Corp. to Melbourne, Fla., from Orlando, the firm has received inquiries from 12 foreign countries regarding agencies for the aircraft. Frank C. (Jerry) Andrews has recently been appointed sales manager for Monocoupe, by Robert G. Sessler, president. Andrews formerly was with CAA, and more recently with Personal Airplane Sales Corp., and with Aerolog, aviation parts directory. Production of airplanes is scheduled to start in February. An estimated 30 persons were to be employed by Feb. 1. The Melbourne company is a result of the purchase by the Sessler Brothers Automotive Co., repair base operator at Melbourne, of the equipment and parts and manufacturing rights of the Monocoupe Orlando plant. Plan now is to manufacture two-place 115 hp. Monocoupe, selling for $3,890 flyaway, and a deluxe version with two-position Sensenich propeller and complete instrumentation for $4490 flyaway. Company also projects a two-place 185 hp. clipwing Monocoupe, and a five-place twin engine plane, now in development stage. Monocoupe's old time air show laurels were polished up anew at the recent Miami Air Maneuvers, when Woody Edmondson, Lynchburg, Va., fixed base operator and stunt and racing pilot flew a clipwing Monocoupe to win the international aerobatic championship. —ALEXANDER McSURELY

American and United Declare Dividends on Preferred Stocks

Action seen as boost for airline credit, confidence in future; American maintains continuity of dividends since equity issue in June, 1946.

Airline credit received a much needed lift when American and United Air Lines declared the regular dividends due on their respective preferred stocks.

With mounting deficits and beset with many uncertainties, these two trunk lines by their action, indicated confidence in the future.

The listed market quotations for the preferred stocks of these companies had declined into new low ground recently, casting some doubt as to their reliability as income producers. Current management action may be expected to have some bolstering effect.

▶**American Maintains Record**—American declared the regular quarterly dividend of $.875 per share payable Mar. 1, 1948, on its $3.50 cumulative convertible preferred stock. This payment will aggregate $350,000 on the 400,000 shares of preferred stock outstanding and maintains the continuity of dividends on this senior equity since its issuance in June 1946. Despite current deficit operations, this disbursement is a small price to pay for the maintenance of an unbroken dividend record.

After declining to a new low of 50¾, American's preferred recovered to around 56, affording a current yield at the rate of 6.2 percent. This issue was first sold at $102 per share almost two years ago.

Through rigid economies, American has kept operating expenses under control thus husbanding its cash position. As far as can be determined, the company should be able to meet all of its immediate capital requirements without need of additional financing. It is believed that through a series of circumstances American may not be required to make any large cash expenditures in accepting delivery of the first group, about one-third of its now reduced order for 75 Convair-Liners.

It is probable that American may establish a line of banking credit on a stand by basis to handle any unanticipated developments requiring unusual cash disbursements. It is reasonable to assume that should such banking credits be established and drawn upon, dividend payments would be precluded unless earned. However, the company expects to restore rapidly its DC-6s in regular service starting around Mar. 1.

▶**United Action**—The United dividend action, unlike American's, was in doubt to almost the last moment. The carrier declared the regular quarterly dividend of $1.125 per share on its 4½ percent cumulative preferred stock, also payable Mar. 1. This current payment aggregates about $106,875 on the approximately 95,000 shares outstanding.

The United preferred was issued in January, 1947, at an indicated price of around $105 per share. When its dividend payment began to appear doubtful, the market price broke sharply to a low of 75. The recent recovery brought the market price up to around 82 which indicates a current yield at the annual rate of 5.5 percent.

The current dividend payment on the United preferred is made possible largely by a technical accounting transfer. Late in 1947, the company announced that it was transferring $2,000,000 from its depreciation reserve account to earned surplus (AVIATION WEEK, Dec. 29, 1947). This stratagem has permitted the company to avoid a negative surplus account, albeit by a very slim margin.

While the company may have sufficient latitude to pay dividends on its preferred stock despite the restrictions written in for the protection of the bank loans and debentures during periods of deficit operations, it is questionable whether a management would attempt this action unless an earned surplus account existed.

▶**DC-6 Boost**—United is also anticipating a restoration of earnings upon the return to service of the DC-6s. This equipment will be particularly profitable on the heavily traveled Hawaiian route operation. The DC-6s also carry a premium fare and are capable of developing a higher rate of earning power than is currently the case with the relatively higher cost DC-4s.

United, however—unlike American—may be faced with a serious financing problem. The former as yet has not selected a replacement for its DC-3 equipment. The company cannot long afford to remain at a competitive disadvantage while American will be flying its pressurized Convair-Liners. Should United embark upon a program of acquiring new Convair Liners, it will do so at a much higher unit cost than American. Further, United may be forced to raise additional capital funds to finance the acquisition of such new equipment. The status of the capital markets has made it difficult for old-line industrial companies with consistent earnings records to obtain additional funds on favorable terms, an airline without current earnings may find public financing far more difficult if not next to the impossible.

▶**Northwest Stock Outstanding**—The third airline with a preferred stock currently outstanding is Northwest. This carrier paid the regular quarterly dividend of 28¾ cents per share on its 390,000 shares of 4.6 preference shares. This payment aggregated $112,125 and was made on Feb. 1, 1948. These shares were marketed in April of last year at $25 per share. Currently selling around 22, an annual yield of about 5.2 percent is indicated. This carrier, at last reports, continues to have an $18 million bank credit it has not drawn upon, which presumably will be used to finance Stratocruisers later this year.

All three airline preferreds indicated are convertible into common stock. This provides considerable attraction in times of rising prices with earnings in an uptrend. American's preferred is convertible into common at $21 per share. United's preferred has the option of exchanging four shares of common for each share of preferred. Each share of Northwest preference stock has a call on one and one-half shares of common.

▶**Atlas Will Underwrite**—Northeast Airlines currently is proposing to issue a convertible preferred stock. However, for all practical purposes this does not represent new financing but for the most part is merely a refunding operation of advances made by the Atlas Corp. The stockholders of Northeast common will have the right to subscribe to a new issue of 83,333 shares of preferred stock. The Atlas Corp., currently holding 100,000 or 20 percent of Northeast's total common stock, has agreed to underwrite all preferred shares not subscribed by the other stockholders. The proceeds received in this manner will be used to retire notes and loans held by the Atlas Corp.

In all cases, basic values for airline equities, both common and preferred, will depend on the earning power the respective companies can develop in the future.

—Selig Altschul

House Committee Will Push Bill To Aid Independent Air Freighters

Rees Post Office group seeks air parcel post system on terms favorable to contract carriers; contracts would be awarded, after competitive bidding, to low bidders.

The House Post Office Committee, headed by Kansas' GOP Rep. Ed Rees, is set to push legislation paving the way for independent air freight operators to capture the nation's potentially large air parcel post business, estimated at 144 million packages annually.

The measure, introduced by Rees on behalf of members of the Post Office Committee, would authorize the Department to inaugurate air parcel post service (it is believed the service would attract at least 10 percent of the surface-transported parcel post volume) on the following basis:

• **Contracts for air parcel post carriage** would be awarded by the Department, after competitive bidding, to low bidders. Civil Aeronautics Board would be required to pass on the ability of carriers to perform adequate service.

• **Short-haul service** within the first, second, and third zones would be prohibited. This is based on the committee's conviction that short-haul air service has slight, if any, time-saving value.

• **Rates proposed** in the bill for parcel post shipments, substantially below the rates suggested two years ago by the Post Office Department, would be: fourth zone—20 cents for the first pound, 10.5 cents for the next nine pounds, and 10.25 cents for each additional pound; fifth zone—25 cents for the first pound, 16 cents for the next nine pounds, and 15.5 cents for each additional pound; sixth zone—31 cents for the first pound, 25.5 cents for the next nine pounds, and 22.25 cents for each additional pound; seventh zone—37 cents for the first pound, 29.5 cents for the next nine pounds, and 29.25 cents for each additional pound; eighth zone—43 cents for the first pound, 36.5 cents for the next nine pounds, and 36.25 cents for each additional pound.

• **Reduction of these rates** to encourage increased volume if the Department obtained parcel post contracts at less than a 15 cents per ton-mile rate.

• **Air parcel post service** to the Canal Zone and territories could also be introduced if such service was self-supporting.

The Rees measure is designed to establish a parcel post system of air service between key traffic points, with trans-shipments to minor traffic points left to the less expensive surface transport modes. This is the type system which has been recommended by independent airfreight operators and would dovetail with their major point-to-major point type of operation.

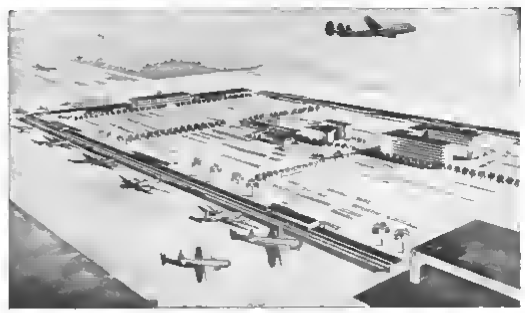
▶**Describes System**—"It is ridiculous to contemplate an air parcel post system giving all-the-way air service to every town and hamlet in the country," Rees declared. "Such a system would be expensive, would undoubtedly keep the service in the red unless excessively high rates were charged, and would offer little or no time saving."

The Air Transport Association, advocate of the "blanket" type air parcel post system criticized by Rees and airfreight carriers, is vigorously opposed to the Rees legislation. ATA favors making air parcel post service an adjunct to regular air-mail service, now monopolized by the scheduled carriers, with CAB certificates authorizing mail carriage extended to include parcel post. Independent airfreight operators complain that this would bar them from handling government parcel post business, as well as regular mail business.

▶**P.O. Favors ATA**—Post Office Department leans in favor of ATA's position. Testifying before the House Post Office Committee, Postmaster General Jesse Donaldson pointed out that if parcel post were an adjunct to air-mail service the Department could use excess airline space—now paid for mail transport—for parcel post shipments.

The House Post Office Committee is withholding hearings "for a few weeks" on the Rees measure to permit the Post Office Department to file its recommendations.

Two years ago, the Department drafted legislation embodying its recommendations for an air parcel post system in a bill introduced by Rep. Thomas O'Brien (D., Ill.). It was reintroduced in this Congress by Rep. Harold Hagen (R., Minn.) and is pending before the House Post Office Committee. However, the Department has requested the committee to pigeonhole the measure, since a review indicates that the rates it prescribes would fail to assure a self-supporting service.



PROPOSED TWIN CITIES TERMINAL

Facilities planned for air travelers at the Twin Cities are shown in this artist's conception of a new terminal development at Wold-Chamberlain field. Covering 25 to 30 acres, the proposed terminal is to provide 28 loading positions for feeder-lines, domestic trunk carriers and international operators. First floor of the administration building (center, foreground) has been designed to handle immigration, customs, agriculture, FBI and health offices. Cost of building facilities for aviation purposes has been set at about $2,000,000. Private capital would finance construction of a hotel (right, center), theater (center) and a shopping area within the unit terminal system. The parking areas are designed to accommodate 5,000 automobiles.

SLICK LANDING BY NORTHWEST

Icing a runway at Wold-Chamberlain field, Minneapolis, and crowding passengers into the rear of the ship to keep the nose high helped in landing this Northwest Airlines DC-4 despite a damaged nosewheel. After taking off with the Chicago-bound DC-4, Capt. Harold Kittleson noticed the plane's nosewheel had not retracted fully into the nose of the ship. He began circling the field while ground crews prepared for the landing. Capt. A. S. Ackerson, a NWA pilot who happened to be in the control tower at the time, suggested icing a runway. Two fire companies pumped water onto the northwest-southeast runway, and in the near-zero temperature the surface soon became slick. The plane was landed without damage.

Pay Increases Provided In UAL-ALPA Contract

United Air Lines and the Air Line Pilots Association late last month signed their new contract embodying substantial pay increases and modified grievance procedure.

Under the revised pay scale, a senior officer flying 80 hours a month (half by day and half by night) will receive from $909.24 for DC-3s to $1,266.68 monthly for DC-6s on the San Francisco-Honolulu run. The new domestic rate for DC-6 pilots is $1,186.68 monthly.

Co-pilot pay will range from $290 to $450 monthly after four years of service and $490 after five years. This contrasts with the old scale of $220 to $380 monthly after four years. United will pay $50 a month additional over the co-pilots' scale to reserve pilots who have flown 300 hours as captains and who have been placed on co-pilot status because of a reduction in the airlines' schedules.

Grievance procedure is modified so that the issues will be taken up with flight managers before going to higher levels. This was the final matter at issue in the negotiations, and at one time provoked a strike threat from the ALPA.

NAL Cites Problems On Havana Operation

Heavy competition both from foreign carriers and from Pan American Airways has brought about substantial losses on National Airlines' routes to Havana, Cuba.

NAL told the Civil Aeronautics Board it sustained a net operating loss of $64,002 on its Tampa/Miami to Havana link between Dec. 15, 1946, when service was inaugurated, and Nov. 30, 1947. The carrier said it lost a large amount of traffic to Linea Aeropostal Venezolana and Peruvian International Airways "which are authorized to fly nonstop from Havana to New York and Washington, while National is required to stop all flights at Tampa."

Services into Cuba are extraordinarily expensive because of the very high landing and aircraft handling fees at Rancho Boyeros Airport—the only field available to U. S. carriers serving Havana, NAL declared. Taking into consideration recent wage and gasoline price boosts, National said the current trend of operating revenues and expenses is such as to indicate continued losses on the Havana link in the future. The carrier is seeking 95 cents a plane mile mail pay for the route.

Future of Tudor I Decided by British

Future of the Tudor I—Great Britain's postwar, four-engine transport which allegedly was cold-shouldered by British Overseas Airways Corp.—has been decided by a government committee of inquiry.

Blaming both A. V. Roe (manufacturer of the Tudor I) and BOAC for failure to cooperate more closely in bringing the 24-passenger craft into operational use, the government report said the ship should go into overseas service if final tests are successful. A. V. Roe had charged that BOAC insisted on numerous alterations to delay production to the Tudor I and then bought U. S. planes.

▶**BOAC Justified**—The committee declared BOAC was justified in buying Constellations for its north-Atlantic service in 1945, "when it was plain the Tudor was late and it was impossible to estimate with any accuracy when it might be available."

When ready, the Tudor I, with necessary modifications, should be operated in a manner best suited for development of BOAC's services, the report said. It is expected that the new plane will be used for service to the Middle East, India and possibly to Australia, but (in accordance with BOAC's wishes) probably not on the highly competitive north-Atlantic run.

BOAC is now operating its London-New York route with Constellations. It expects to add six Boeing Stratocruisers to its north-Atlantic fleet late this year.

BSAA in Black

British South American Airways Corp., smallest of Great Britain's three state-owned carriers, has reported a profit of about $82,000 during its first eight months of operation to Mar. 31, 1947. Previously, British Overseas Airways Corp. and British European Airways had shown deficits aggregating more than $40,000,000 for their first operating years (AVIATION WEEK, Jan. 5 and Jan. 12).

Cargo Rate Ruling

Taking action to maintain the status quo pending outcome of its broad investigation of airfreight rates, the Civil Aeronautics Board has extended for 90 days the suspension period of reduced cargo tariffs filed last fall by seven certificated airlines (AVIATION WEEK, Nov. 3).

The original 90-day suspension, involving tariffs filed by American Airlines, Inland, Western, PCA, United, Southwest and TWA, expired Jan. 22. A public hearing on CAB's freight rate investigation is scheduled this week.

Meanwhile, both certificated and uncertificated carriers report that the normal seasonal decline in cargo has been less than usual during January. A third increase in Railway Express Agency's first-class surface rates in little over a year has given air cargo officials further cause for optimism. The new 10 percent hike went into effect Jan. 22, and is expected to shift considerable traffic from surface to air.

SHORTLINES

▶**Bruning Aviation**—CAB has denied the Springfield, Mass., carrier a special exemption which would have permitted the company to qualify as an uncertificated cargo line under section 292.5 of the Board's Economic Regulations.

▶**Florida Airways**—Company's AM-75 feeder certificate has been amended by CAB to include Perry and Leesburg, Fla., as intermediate points.

▶**Linea Aeropostal Venezolana**—CAB has extended the company's foreign air carrier permit for three months.

▶**Mid-Continent**—Workers who are members of the Brotherhood of Railway and Steamship Clerks, Freight Handlers and Station Employes have been awarded wage increases of 17 cents an hour (for those paid by the hour) and $29.47 (for those paid monthly). Findings were made by a National Mediation Board panel of arbitrators. The union has sought an hourly increase of 50 cents and a monthly hike of $86.67.

Company has bought three additional DC-3s to handle traffic over its new Kansas City-St. Louis route.

▶**Monarch**—During its first year of operation ended Nov. 27 flew 3,552,684 passenger miles and 69,361,730 pound miles of freight.

▶**Pioneer**—Carried 62,698 passengers in 1947 against 20,687 in 1946, mail ton miles increased from 19,449 to 37,147, and express ton miles from 6,539 to 17,842. Passenger traffic per plane mile gained more than 27 percent over 1946.

PAL, in cooperation with the University of Texas, expects to inaugurate a program of practical training for air transportation students this month.

▶**Skytrain Airways**—CAB has denied the New Orleans operator a temporary exemption to carry passengers on an irregular basis between New Orleans and Belize, British Honduras, pending disposition of the company's application for a certificate.

▶**Trans-Canada**—Has established a New York district cargo sales office.

▶**TWA**—Carried 66,384 international passengers in 1947, a gain of 103 percent over 1946. Express and freight increased 220 percent to 3,016,245 ton miles, and mail was up 75 percent to 3,273,501 ton miles.

▶**United**—Between May 1, 1947, when service started, and Dec. 31 flew 16,145 persons between San Francisco and Honolulu. Air mail totaled 196,000 ton miles and freight 77,000 ton miles. UAL expects to have vacancies for 400 stewardesses this year and will re-open its training school at Cheyenne, Wyo., on Feb. 4.

American Names Miller To Board of Directors

Robert W. Miller, president of the Pacific Lighting Corp., has been elected to American Airlines' board of directors. He will replace James Bruce, who resigned from the board last September after being named Ambassador to Argentina.

At the same time AA announced the appointment of William H. Hipple as southern regional director of public relations with headquarters at Dallas. Hipple recently returned from Europe, where he was a public relations executive for American Overseas Airlines.

Other personnel developments:

● **Irish Air Lines**—Has named John M. Cody as advertising and public relations officer in the U. S. with headquarters in New York. He was formerly eastern advertising manager for Lockheed Aircraft Corp.

● **National**—Gilbert G. Budwig has been appointed to the newly-created post of director of planning, and Adolph C. Lieke has become director of maintenance.

● **Northeast**—Robert H. Herrmann has been elected assistant treasurer.

● **Northwest**—Has appointed C. E. Swanson to head the NWA staff at Boeing's Seattle plant. He succeeds E. B. Curry, who recently was named general superintendent of aircraft maintenance for Northwest.

● **Slick**—W. F. Rogers, vice president in charge of sales and traffic, has been appointed to the new post of vice president and assistant to the president.

● **United**—J. W. Eberly has become assistant vice president personnel. Homer J. Marchant has been named assistant general manager of ground services.

● **Western**—M. E. Sullivan has been appointed assistant general traffic manager.

Irish Get Permit

Aer Linte Eireann Teoranta (Irish Air Lines) has received a foreign air carrier permit from CAB and will become the ninth scheduled operator on the Europe-U. S. run when service is inaugurated Mar. 17. The permit authorizes flights between Ireland and New York via Newfoundland and Boston; and between Ireland and Chicago via Newfoundland and Montreal, Canada. Model 749 Constellations—of which AET owns five—will make three round-trips weekly on the Ireland-New York route at the outset (AVIATION WEEK, Jan. 12).

CAB SCHEDULE

Feb. 2. Hearing on Board's investigation of airfreight rates. (Docket 1705 et al.)

Feb. 4. Hearing on Continental Air Lines' route consolidation case. (Docket 576 et al.)

Feb. 9. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans route. (Docket 1956.)

Feb. 21. Hearing on Mid Continent's Minot, N. D.-Regina, Saskatchewan route case. (Docket 628.)

Mar. 16. Hearing on additional service in Hawaiian Islands. (Docket 2338 et al.)

May 18. Hearing on Capital Airlines (FCA) mail rate case. (Docket 484.)

Canadian Embargo Hurting Colonial

Canada's dollar shortage is having an adverse effect on air travel between the U. S. and the Dominion, according to a recent Colonial Airlines report to the Civil Aeronautics Board.

Last November, Colonial pointed out, Canada passed a law which limited Canadian citizens to expenditures aggregating about $150 yearly anywhere except in sterling exchange areas. In addition, the embargo prevents importation into Canada of a great number of articles and commodities produced in the U. S., the report said.

▶ **Traffic Hit**—"Effect of this embargo is to reduce sharply the traffic available in Canada as well as commercial traffic generated in the U. S. Canadians who in the past frequently used Colonial's service from Ottawa and Montreal to New York and Washington for business, personal or vacation purposes, can no longer make more than one or two trips per year and may, for patriotic reasons, refrain from making any trip to the U. S."

Colonial said American businessmen who traveled to Canada over Colonial's routes will not be able to make sales in the Dominion while the embargo lasts. The carrier added that in all probability the embargo will continue for the duration of the dollar shortage.

The carrier indicated that the embargo makes higher mail pay even more urgent. Colonial said it had an operating loss of $818,789 (at its present 20 cents a plane mile mail rate) on its U. S. and Canadian links during the first 11 months of 1947. A mail rate increase to 50 cents a plane mile was requested.

United Opposes Parks On Certificate Request

Parks Air Transport's request that CAB issue the certificate covering routes designated for PAT in the Board's Great Lakes and North Central Area decisions has run into strong opposition from United Air Lines.

United told CAB that Parks is seeking to "remake" the routes awarded to it by the process of exemptions, substitutions and suspension of service. CAB, in designating Parks for the routes, said it would issue a certificate when the feeder showed that sufficient airports are available to permit operations in accordance with the Board's intentions. UAL states that Parks can not serve the "reasonable number of points" specified by CAB.

United said that of the 41 points awarded Parks in the North Central and Great Lakes cases, 23 points are not certificated on trunkline systems. "At 18 of these 23 new cities, airport facilities are inadequate, and at one additional point they are questionable. If given a certificate, Parks would promptly request authority to suspend service at those 18 or 19 cities. Thus, notwithstanding the award to it of 2,250 miles of routes in six states, Parks would provide service to a total of only four or five new cities."

Meanwhile, Ozark Air Lines, unsuccessful applicant in the Mississippi Valley Area case, asked a rehearing and reconsideration of that proceeding, contending that CAB had erroneously given Parks routes which can best be served by Ozark. Ozark said that "because of severe financial losses suffered by Parks and its affiliated companies during the past two years, it is not fit, willing and able to perform the services found to be required."

Certificate Transferred

CAB has approved the transfer of Peterburg Air Service's certificate of public convenience and necessity to Alaska Island Airlines, Ketchikan.

SEARCHLIGHT SECTION

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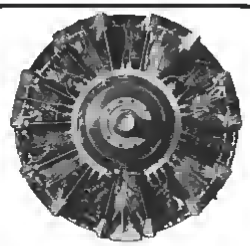

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ADVERTISERS INDEX

AVIATION WEEK

FEB. 2, 1948

SEARCHLIGHT SECTION

(Classified Advertising)

EDITORIAL

Lightplanes Looking Up

Lightplane makers have been subjected to a barrage of criticism since war's end for lacking vision and enterprise. But the paralysis of prewar designs is being shaken off. There are heartening signs of progress, especially in the competitive four-place market described by Alexander McSurely in this magazine Dec. 15. It is seldom that publicity has failed to keep up with technical advancements in aviation, but this is an example.

Broadly, these trends are apparent:

With few exceptions designs are toward non-spin or spin resistant characteristics.

Efforts toward reduction of noise—both outside and for the occupant—are barely started, and are far from satisfactory. But industry attitude toward noise is in sharp contrast to the lethargy of a year ago. The Beech Bonanza and Stinson probably lead in efforts to date. Important experiments such as those at Boston are underway.

Four-placers are showing unprecedented roominess and ease of entry.

Controllable and two-position propellers for light planes are gaining recognition from airframe manufacturers.

More power is available, partly through larger engines, partly by increasing output of established engines.

Development of improved landing gears, both fixed and retractable, moves ahead, with castering gears and wheels for cross wind landing.

Use of flaps and slots is increasing.

Manufacturers are deeply interested in stall warning indicators, and announcements are expected from more firms who will offer these devices as optional or standard equipment.

Although there is no favoritism intended here, it appears from this vantage point that Beech, Stinson, Cessna and Luscombe have built more postwar engineering improvements into their products than any others now on the market. Navion, Swift and Ercoupe all represented advanced designs when they appeared but modifications have been minor.

The Bonanza boasts an efficient flap, butterfly tail, flush riveting on its exterior surfaces, and utilizes more magnesium than most other light craft. It has complete instrumentation and two-way radio. A stall warning indicator is standard equipment. It is probably the fastest ship in the four-place class. Although virtually a two-control plane in the air, its rudder pedals are available for cross wind landings.

Stinson's popular Voyager developed from the prewar Model 105, which had slots and flaps, an advanced design for its day. Stinson management has registered keen interest in virtually every postwar engineering improvement. It was the first to conduct its own experiments with cross-wind Goodyear wheels on its production model. It was a pioneer in postwar cabin sound proofing and engine muffling, and is carrying this work forward in cooperation with the aeronautical research experiments at Harvard-MIT, whom it lent a Voyager for tests with various multi-bladed Sensenich propellers turned at low speeds by a geared Franklin. Standard two-way radio and a choice of several panels are offered. Stinson has just announced standard installations of the safe flight stall warning indicator on all Voyagers. The plane is spin resistant.

Cessna's vanadium steel landing gear is probably the best known postwar development of any airframe maker, and it has worked out well in improved performance and safety. Now, Cessna is combining the Goodyear wheel with this gear as an optional extra which is the first time this crosswind wheel has been made a CAA approved factory installation.

Luscombe's new Silflex landing gear appears to be equally as good as the Cessna installation, except for possibly some more drag. Luscombe was the first to put an all metal two-placer in production. Most other production models still have fabric-covered wings. Luscombe has sought always to direct its engineering toward economy in production, with the result that its price has been held down. The new Luscombe four placer is reported to have excellent visibility and roominess, good performance, and fixed gearplane.

The Ryan Navion is little changed except for improved appearance and interior fittings, but the company is understood to have plans for new features. It is spin-resistant.

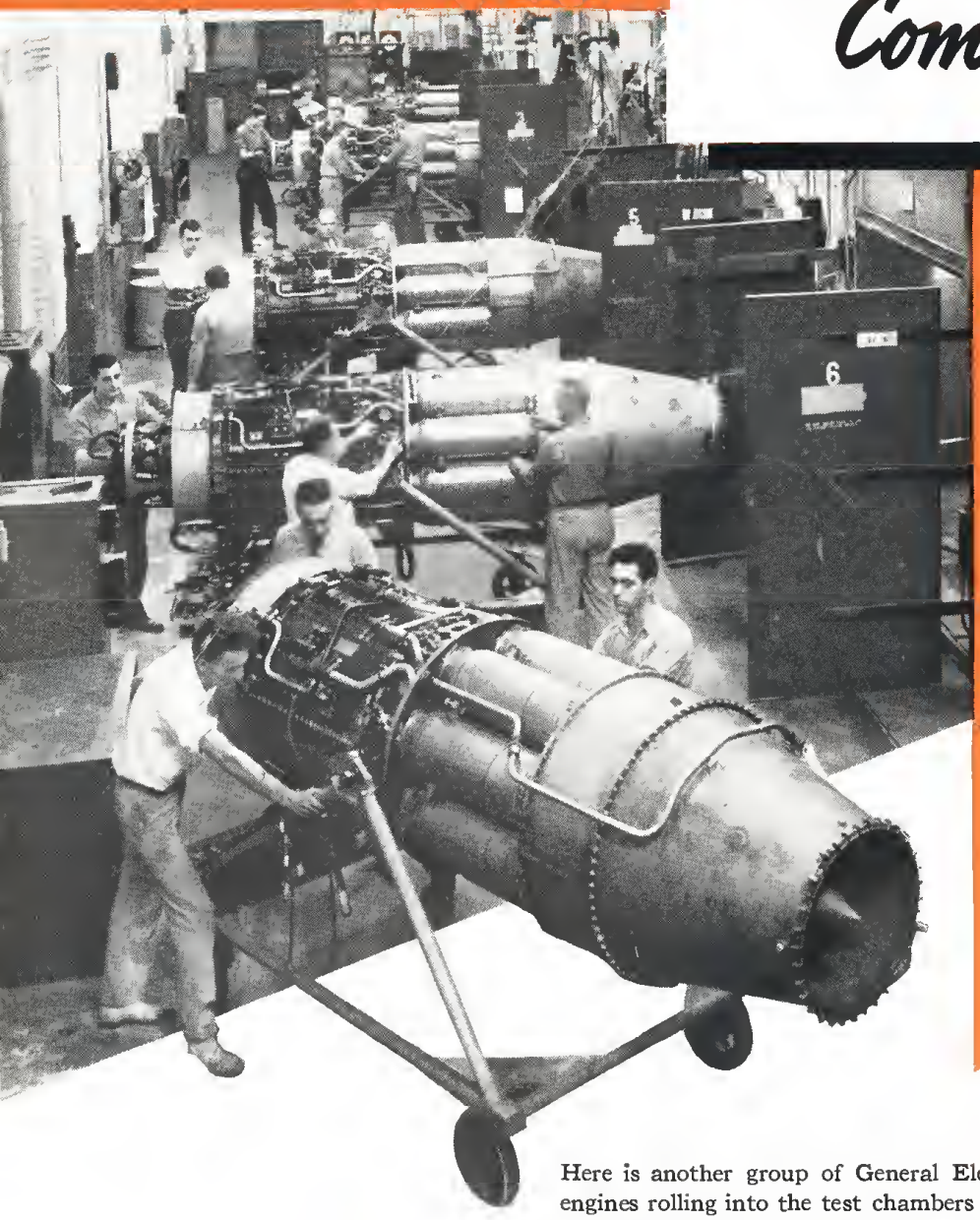
Aeronca and Piper are mainly concerned with basic designs of prewar history.

The Temco Swift 125 is slightly improved over the original Globe 125, but it has the reputation of a high performance two-placer.

Other manufacturers may feel that this is an incomplete outline of major advancements in the postwar lightplane. If they do, let them write to report their improvement plans, present or future. No company striving to improve its product should hide its light under the proverbial bushel, although for too long there have been over optimistic claims in advertising and publicity handouts. The widest publicity given all lightplane improvements, however, can only promote the industry. Lightplane manufacturers are stirring, although there is a long, hard road ahead. More power to them all.

ROBERT H. WOOD

SHAKE-DOWN
Coming up



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